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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Bryan J. Moles, et al.
Serial No.:	09/542,632
Filed:	April 4, 2000
For:	SYSTEM AND METHOD FOR PROVISIONING OR UPDATING A MOBILE STATION USING OVER-THE-AIR TRANSFER OF INTERPRETED BYTE-CODE PROGRAM
Group No.:	2682
Examiner:	Eugene Yun

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Sir:

Applicants herewith respectfully submit that the Examiner's decision of February 22, 2005, finally rejecting Claims 1-20 in the present application, should be reversed, in view of the following arguments and authorities. This Brief is submitted in triplicate on behalf of Appellant for the application identified above. A check is enclosed for the fee for filing a Brief on Appeal. Please charge any additional necessary fees to Deposit Account No. 50-0208.

TABLE OF CONTENTS

TABLE OF AUTHORITIES

Real Party in Interest

The real party in interest, and assignee of this case, is Samsung Electronics Co., Ltd.

Related Appeals or Interferences

To the best knowledge and belief of the undersigned attorney, there are none.

Status of Claims

Claims 1-20 are under final rejection. Each of Claims 1-20 is appealed.

Status of Amendments after Final

No amendments were filed after final rejection. A response was filed after final rejection, but this response did not include any amendments.

SUMMARY OF CLAIMED SUBJECT MATTER

The following summary refers to disclosed embodiments and their advantages, but does not delimit any of the claimed inventions.

In General

The present application is directed, in general, to wireless networks and, more specifically, to a system for performing secure over-the-air (OTA) provisioning or OTA updating of cellular phone handsets and other mobile devices.

Support for Independent Claims

Note that, per 37 CFR §41.37, only the independent claims are discussed in this section. In the arguments below, however, the dependent claims are also discussed and distinguished from the prior art. The discussion of the claims is for illustrative purposes, and is not intended to modify the scope of the claims.

Figure 2 of the present application is shown below. Figure 2 illustrates selected portions of an exemplary wireless network 100 that performs over-the-air (OTA) service provisioning according to an embodiment of the present invention. Independent Claim 1 is drawn to a provisioning system, e.g., provisioning server 160 as shown in Figure 2. Independent claim 6 is drawn to a mobile station to be provisioned, e.g., MS 112 as shown in Figure 2. Independent claims 11 and 16 are drawn to methods of provisioning a mobile station in a wireless network, e.g., a wireless network as shown in Figure 2.

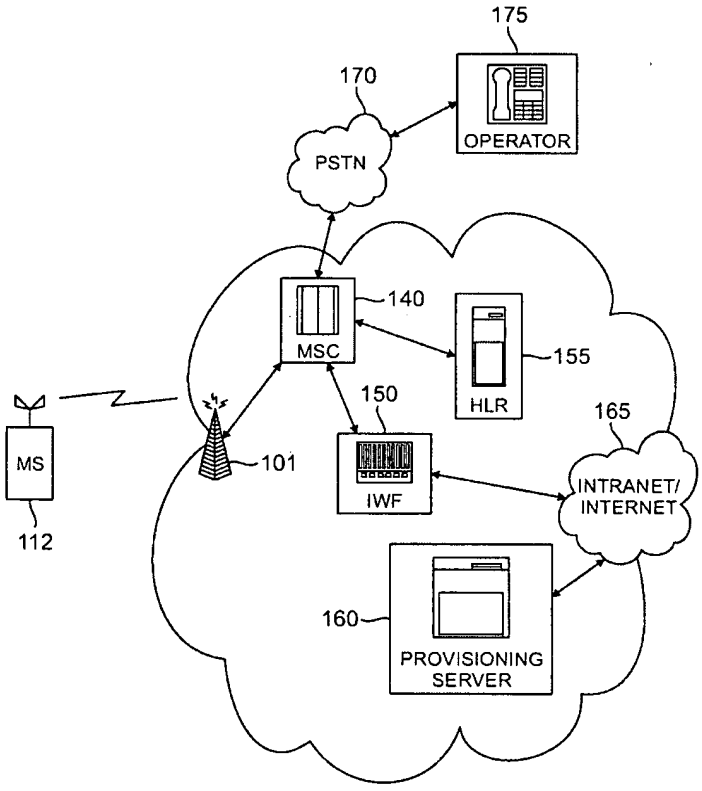

FIG. 2

Figure 3 is depicted on the next page. Figure 3 illustrates an exemplary provisioning server 160 according to an embodiment of the present invention, as described in independent Claim 1.

Independent Claim 1 includes a service provisioning system (160) that is capable of provisioning a mobile station, for use in a wireless network (100) comprising a plurality of base

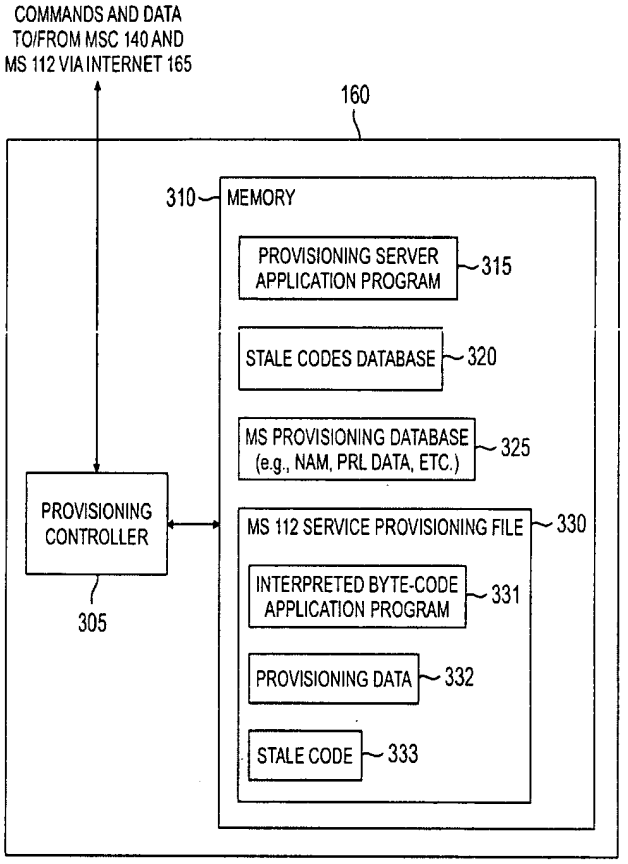

FIG. 3

stations (101), each of said base stations capable of communicating with a plurality of mobile stations (112). *Figs. 2 and 3, and page 9, lines 4-8.*

Independent Claim 1 describes that the provisioning system (160) includes a database (325 in memory 310) capable of storing a service provisioning file (330) comprising a mobile station service provisioning program in interpreted byte-code format (331). *Fig. 3, page 9, lines 9-12.*

Independent Claim 1 further describes that the service provisioning system includes a provisioning controller (305), coupled to the database, capable of receiving a notification indicating that a mobile station (112) is unprovisioned. The provisioning controller is further capable, in response to receipt of the notification, of retrieving the service provisioning file from the database and transmitting the service provisioning file to the first mobile station. *Figs. 2 and 3, and page 9, lines 12-18.*

Independent Claim 1 further describes that receipt of the service provisioning file (330) causes the mobile station (112) to automatically execute the mobile station service provisioning program (331) in the service provisioning file, and that execution of said mobile station service provisioning program automatically provisions the mobile station (112) without further interaction from a service operator. *Figs. 1 and 2, page 9, lines 15-21, and page 32, lines 3-4.*

Figure 4, next page, illustrates an exemplary mobile station (112) according to one

embodiment of the present invention.

Independent Claim 6 describes a mobile station (112) capable of being provisioned from a wireless network by an over-the-air (OTA) service provisioning process, where the mobile station includes an RF transceiver (410) capable of receiving and demodulating forward channel messages from a wireless network and further capable of modulating and transmitting reverse channel messages to the wireless network. *Figs. 2 and 4, and page 10, line 19 - page 11, line 4.*

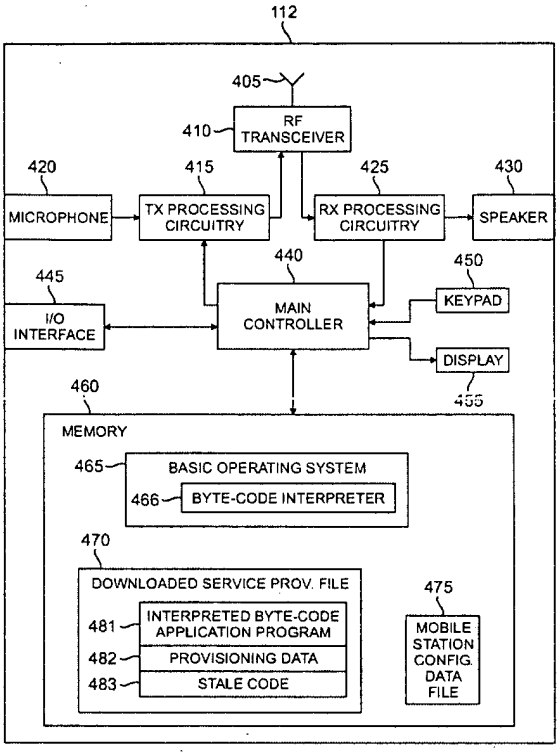

FIG. 4

Claim 6 also includes a main controller (440) capable of receiving the demodulated forward channel messages from the RF transceiver (410) and extracting therefrom a service provisioning file (470) containing a mobile station service provisioning program in interpreted byte-code format (481). Claim 6 indicates that the main controller, in response to receipt of the service provisioning file, is capable of interpreting and executing the mobile station service provisioning program, where execution of the mobile station service provisioning program automatically provisions the mobile station without further interaction from a service operator. *Figs. 2 and 4, page*

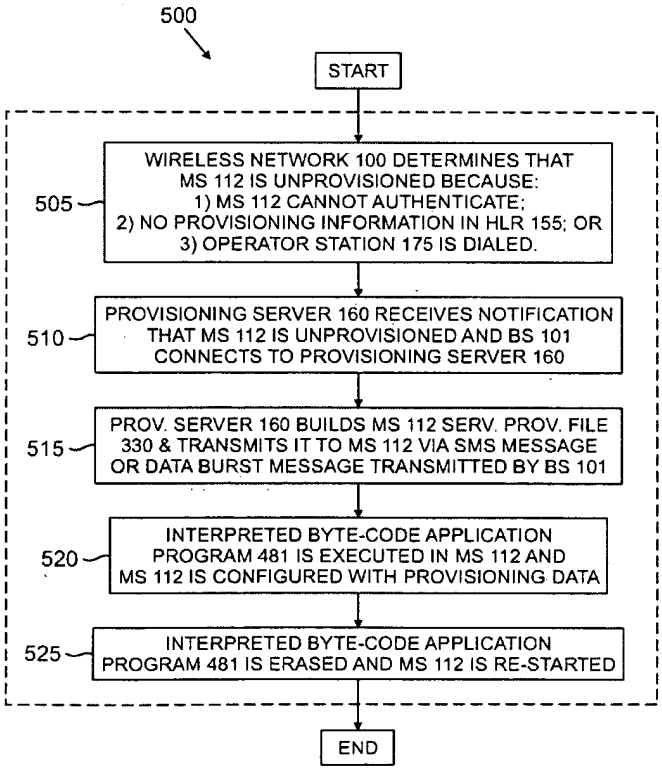

FIG. 5

11, lines 1-11, and page 32, lines 3-4.

Figure 5, at right, depicts a flowchart of a process in accordance with a preferred embodiment.

Independent Claim 11 provides a method of provisioning a mobile station. This method includes storing in a database (325) a service provisioning file (330) comprising a mobile station service provisioning program in interpreted byte-code format (331). The method also includes determining whether the first mobile station (112) is provisioned (505);
in response to a determination that the mobile station is unprovisioned, retrieving the service provisioning file from the database and transmitting the service provisioning file to the first mobile station. *Figs 1, 3, and 5, page 33, lines 3-14, and page 26, lines 16-18.*

According to Claim 11, receipt of the service provisioning file causes the first mobile station to automatically execute the mobile station service provisioning program in the service provisioning file, where execution of the mobile station service provisioning program automatically provisions the first mobile station without further interaction from a service operator. *Fig. 5, page 33, lines 15 - 20, and page 32, lines 3-4.*

Independent Claim 16 describes a method of performing an over-the-air (OTA) service provisioning of the mobile station from the wireless network. Claim 16 includes receiving and demodulating forward channel messages from the wireless network (100), and extracting from the demodulated forward channel messages a service provisioning file (470) containing a mobile station service provisioning program in interpreted byte-code format (481). *Figures 1 and 4, page 28, lines 18-22, and page 30, lines 16-18.*

Claim 16 also provides interpreting and executing the mobile station service provisioning program, wherein execution of the mobile station service provisioning program automatically provisions the mobile station without further interaction from a service operator, and wherein the mobile station service provisioning program comprises a graphical user interface (GUI) program capable of interacting with a user of the mobile station during the OTA service provisioning process.

Page 31, line 20- page 32, line 7.

Grounds of Rejection to be Reviewed on Appeal

1. Are Claims 1, 2, 5-7, 11 and 12 obvious over Chang *et al.* (USP 6,223,028, "Chang") in view of Hoffman (USP 6,622,017, "Hoffman")?
2. Are Claims 10, 16, 17 and 20 obvious over Chang and Hoffman in view of Vucetic *et al.* (USP 5,819,177, "Vucetic")?
3. Are Claims 3, 4, 8, 9, 13-15, 18 and 19 obvious over Chang , Hoffman, and Vucetic in view of Weber *et al.* (USP 6,314,282, "Weber")?

ARGUMENT

Stated Grounds of Rejection

The rejections outstanding against the Claims are as follows:

In Sections 1 and 2 of the February 22, 2005 Office Action, Claims 1, 2, 5-7, 11 and 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over U. S. Patent No. 6,223,028 to Chang *et al.* (hereafter, simply "Chang") in view of U. S. Patent No. 6,622,017 to Hoffman (hereafter, simply "Hoffman").

In Section 3 of the February 22, 2005 Office Action, Claims 10, 16, 17 and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Chang and Hoffman references in view of U. S. Patent No. 5,819,177 to Vucetic *et al.* (hereafter, simply "Vucetic").

In Section 4 of the February 22, 2005 Office Action, Claims 3, 4, 8, 9, 13-15, 18 and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Chang, Hoffman, and Vucetic references in view of U. S. Patent No. 6,314,282 to Weber et al. (hereafter, simply "Weber").

Legal Standards[1]

The legal standards for an obviousness rejection are referenced in the footnote below.

Analysis of Examiner's Rejection

The cited references are each briefly discussed in relevant part, and then the rejection of each claim is addressed.

Chang discloses a system and method for programming a mobile telephone over the air within a wireless network. Chang teaches, at col. 4, lines 32-39, that the mobile includes a "protocol capability response message," which Examiner Yun characterizes as the claimed "service provisioning file" discussed herein. Examiner Yun notes that Chang does not teach other significant

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[1]The Supreme Court has explained how to apply §103:

> Under §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or non-obviousness of the subject matter is determined.
>
> *Graham v. John Deere Co.*, 383 U.S. 1, 148 U.S.P.Q. 459, 467 (1966).

Obviousness cannot be inferred from a combination of references without a showing that one of ordinary skill would have been motivated to combine those references:

> When prior art references require selective combination ... to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself.... Something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination.
>
> *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 5 U.S.P.Q.2d 1434, 1438 (Fed.Cir. 1988), *quoting Interconnect Planning Corp. v. Feil*, 227 U.S.P.Q. 543 (Fed.Cir. 1985), *and Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick*, 221 U.S.P.Q. 481 (Fed.Cir. 1984).

limitations of the claims, as discussed below.

Hoffman is drawn to over-the-air (OTA) programming of wireless terminal features. It is important to note that Hoffman was filed on April 24, 2000, which is after the April 4, 2000 filing date of the present application, and claims priority to a provisional application filed February 25, 2000, which is before the filing data of the instant application. As such, any teaching of Hoffman relied upon in a rejection of the present claims must be found in the provisional application. For the convenient reference of the Board, a copy of provisional application 60/185,131 is attached as an appendix. Examiner Yun relies on Hoffman for a variety of features, but fails to show that these teachings are supported in the provisional application, as detailed below.

Vucetic discloses fixed wireless terminals with a network management method and apparatus. Examiner Yun references Vucetic with relation to a GUI interface, and Vucetic teaches in col. 7, line 38-42, lines 59-64, and col. 8, lines 9-10 that a network management computer includes a GUI interface between the user and the network management computer.

Weber is drawn to a system and method for transmitting group ID information to exclude a group of mobile terminals from changing their operating mode. Weber includes a teaching relating to determining a time period since the last reception of "mode change information."

Ground of Rejection 1: Claims 1, 2, 5-7, 11 and 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Chang in view of Hoffman

Claim 1

Claim 1 requires:

For use in a wireless network comprising a plurality of base stations, each of said base stations capable of communicating with a plurality of mobile stations, a service provisioning system capable of provisioning a first one of said plurality of mobile stations comprising:

a database capable of storing a service provisioning file comprising a mobile station service provisioning program in interpreted byte-code format; and

a provisioning controller coupled to said database capable of receiving a notification indicating that said first mobile station is unprovisioned and further capable, in response to receipt of said notification, of retrieving said service provisioning file from said database and transmitting said service provisioning file to said first mobile station,

wherein receipt of said service provisioning file causes said first mobile station to automatically execute said mobile station service provisioning program in said service provisioning file, execution of said mobile station service provisioning program automatically provisioning said first mobile station without further interaction from a service operator.

Applicants concede that some aspects of Claim 1 are shown in Chang. For example, Chang indeed mentions a plurality of mobile stations (mobile telephones) and a wireless network (mobile telephone communication network). However, these elements do not interrelate or function as claimed, and other elements are completely missing, including, of course, those elements conceded by Examiner Yun as not included in Chang, as described above.

For the teachings of Huffman relied upon by Examiner Yun, provisional application 60/185,131 ("the Huffman provisional") must support the obviousness rejections since the non-provisional application on which Huffman's patent issued differs significantly from the Huffman provisional and was not filed until after the filing date of the present application. In his Advisory Action, Examiner Yun was kind enough to reference the portions of the Huffman provisional that he believes will support his rejection. Specific distinctions are addressed below:

"*a service provisioning system capable of provisioning a first one of said plurality of mobile stations comprising: a database capable of storing a service provisioning file comprising a mobile station service provisioning program in interpreted byte-code format*"

This limitation is not taught or suggested by any art of record, and Examiner Yun has not

made any showing of any such teaching. Examiner Yun cites Chang for a "provisioning controller 16 (col. 1)" which evidently refers to Chang's computer system 16, which is indeed part of Over the Air Function (OTAF) 15. However, nothing in Chang teaches or suggests that computer system 16 included a database capable of storing a service provisioning file, as claimed.

Examiner Yun does reference Chang's col. 4, lines 32-39, that describes that the mobile includes a "protocol capability response message," which Examiner Yun characterizes as the claimed "service provisioning file" discussed herein. This "protocol capability response message" is stored in the mobile, not in the service provisioning system, as claimed, and as such cannot be used to support an obviousness rejection.

Further, Claim 1 requires "*a mobile station service provisioning program in interpreted byte-code format.*" Examiner Yun ignores these plain limitations by indicating that "the term 'interpreted byte-code format' is defined by the Examiner as any information that contains bits" (page 10 of final Office Action) and also that "the term 'interpreted byte-code format' is a somewhat broad term that can simply mean information that contains bits" (section 1 of the Advisory Action).

Examiner Yun has never provided any support for his arbitrary "definition." Furthermore, the Applicants respectfully assert that Examiner Yun should not be defining any terms at all. The specification indicates, on page 26,

> Provisioning controller 305 provides a copy of an interpreted byte-code application program to each mobile station being provisioned, including MS 112. The interpreted byte-code application program is an architecture-neutral (i.e., processor independent) program that may be run on any type of processor used by any handset that includes a byte-code interpreter, such as MS 112. The interpreted byte-code application program may be developed in one of several interpreted byte-code languages including Java, perl, Tcl, Python, and Lisp. Provisioning controller 305 stores a copy of the interpreted byte-code application program for MS 112 in interpreted byte-code application program file 331.

Further, "interpreted" is a specific term well known in the programming arts. A quick internet search provides the following exemplary definition, and those of skill in the art would recognize such usage immediately (from http://www.computerhope.com/jargon/i/interpre.htm):

> Interpreted: When referring to a programming language, an interpreted language refers to a language that does not need to be compiled before it is executed. However, because the script or program is not compiled this means the program will need an interpreter to run the program. An interpreter takes the script or program code and interprets it into something that can be executed and understood by the computer. Below are some examples of Interpreted programming languages.
>
> JavaScript
>
> JScript
>
> Perl
>
> PHP
>
> Python

As the section above makes clear, the use of "interpreted" is consistent between the specification and common definition, and is further supported by the presence of byte-code interpreter 466 in the mobile station, as described on page 30 of the specification. The Applicants respectfully assert that Examiner Yun's broad definition of "anything with bits" is completely baseless and in direct conflict with both common usage of the claim terms and the use specifically described in the specification.

Nothing in any art of reference, alone or in combination, teaches or suggests a mobile station service provisioning program in interpreted byte-code format as required by claim 1.

Claim 1 also requires "*a provisioning controller ... capable, in response to receipt of said notification* [that said first mobile station is unprovisioned], *of retrieving said service provisioning file from said database and transmitting said service provisioning file to said first mobile station.*"

Examiner Yun cites to language in Huffman's claim 1 to support his rejection of this

limitation. However, the Huffman provisional does not include this claim language at all, so the Huffman provisional must be examined to determine if it still supports any similar teaching. None of the three parts of Huffman's provisional teaches or suggests this limitation.

The Huffman provisional application refers to an OTA application server 25 and indicates that a provisioning database 27 is accessible by it (see page 9, line 8). The Huffman provisional teaches that the "provisioning database 27 stores data sets necessary to provision stations for the various services offered through the network 3 as well as a data table of all stations 5 served through the network and the services currently provided to each station" (see page 9, lines 3-6).

There is no teaching at all in the Huffman provisional that the provisioning database 27 contains a "service provisioning file" as used in Claim 1 or that the provisioning transmits anything to the mobile station.

The Huffman provisional does discuss a second database, a "feature services database 29" also accessible by OTA application server 25. This database "stores the plug-in modules for all features available to the stations...." (See page 9, lines 11-14). While feature services database 29 includes some sort of additional plug-in modules to add additional features to an already-provisioned mobile station, there is no teaching at all in the Huffman provisional that the feature services database 29 contains a "service provisioning file" as used in Claim 1 or that the feature services database 29 plays any part in provisioning the mobile station to work on the wireless network.

The Huffman provisional teaches that, to provision a mobile station to work on the network, "the OTA application server downloads data such as the mobile identification number to provision service in the handset 5, itself" (see page 10, lines 6-11). No other data appears to be downloaded during this service provisioning process, and certainly not a "service provisioning file" as recited in Claim 1.

Claim 1 also requires "*wherein receipt of said service provisioning file causes said first mobile station to automatically execute said mobile station service provisioning program in said service provisioning file, execution of said mobile station service provisioning program*

automatically provisioning said first mobile station without further interaction from a service operator".

As discussed in detail above, nothing in any cited art teaches or suggests a service provisioning file as claimed, so there is certainly no teaching of automatically executing it or automatically provisioning a mobile station by that execution. For purposes of argument, however, Applicants will examine whether anything in Huffman is downloaded to the mobile station and automatically executed, thereby automatically provisioning the mobile station. Examiner Yun again cites to Huffman's claim 1, not present in the Huffman provisional, to support his rejection of this limitation, so again the Huffman provisional must be examined in detail to determine if it includes any such teaching.

As discussed above, nothing is downloaded or received from Huffman's provisioning database 27 that is described as executable, but the "plug-in modules" can be downloaded by a mobile station already provisioned for service (i.e., whatever "plug-in module" might be received is not received in response to any notification that the mobile station is unprovisioned, as claimed) from feature services database 29, as described in the Huffman provisional. However, nothing in the Huffman provisional teaches or suggests that any downloaded plug-in module is automatically executed after receipt. The Huffman provisional describes that the plug-in modules can be received, extracted, compiled, verified, and stored (see page 11, lines 10-14). The Huffman provisional then teaches that "since the carrier has provisioned the station 5 to operate on the network 3" (see page 11, lines 14-15), "the subscriber can now utilize the station 5 in the normal manner and to take advantage of the selected one or more handset features" (see page 11, lines 15-16). This passage indicates that the mobile station was already provisioned, so that it is not provisioned automatically in response to receiving the plug-in modules, and also implies that the features provided by any plug-in module are only available when utilized by the subscriber, or manually executed. Certainly there is no teaching or suggestion at all that the plug-in modules are automatically executed.

As such, none of the significant limitations of Claim 1 are taught or suggested by Chang,

Huffman, or the Huffman provisional, nor by any other art of record.

Claim 2

Claim 2 requires: "*wherein said service provisioning file further comprises provisioning data used to configure said first mobile station to communicate with said wireless network.*"

The arguments regarding the limitations of parent Claim 1, above, are incorporated herein with regard to this claim.

As neither Chang, Huffman, nor the Huffman provisional, nor any other cited reference or combination of them, teaches or suggests the "service provisioning file" as claimed, none of them teaches the additional features of the service provisioning file of Claim 2.

Claim 5

Claim 5 requires: "*a security apparatus capable of determining that said first mobile station is unprovisioned and, in response to said determination, generating and transmitting said notification to said provisioning controller.*"

The arguments regarding the limitations of parent Claim 1, above, are incorporated herein with regard to this claim.

Neither Chang, Huffman, nor the Huffman provisional, nor any other cited reference or combination of them, appears to teach or suggest this limitation. Certainly nothing in the passage cited by Examiner Yun, Chang's col. 2, lines 54-64, includes any discussion of such a security apparatus.

Claim 6

Claim 6 requires:

A mobile station capable of being provisioned from a wireless network by an over-the-air (OTA) service provisioning process, said mobile station comprising:

an RF transceiver capable of receiving and demodulating forward channel messages from said wireless network and further capable of modulating and transmitting reverse channel messages to said wireless network; and

a main controller capable of receiving said demodulated forward channel messages from said RF transceiver and extracting therefrom a service provisioning file containing a mobile station service provisioning program in interpreted byte-code format,

wherein said main controller, in response to receipt of said service provisioning file, is capable of interpreting and executing said mobile station service provisioning program, execution of said mobile station service provisioning program automatically provisioning said mobile station without further interaction from a service operator.

Certainly, the cited references disclose, in general, a mobile station with an RF transceiver and a controller. However, Claim 6, like Claim 1, requires "*a service provisioning file containing a mobile station service provisioning program in interpreted byte-code format*", that is not taught or suggested by any cited reference. The arguments made above with respect to Claim 1, with regard to the provisioning program in interpreted byte-code format, apply here as well, and are hereby incorporated with regard to this limitation of Claim 6.

Further, Claim 6 requires that the main controller of the mobile station is capable of "*in response to receipt of said service provisioning file, ... interpreting and executing said mobile station service provisioning program*", a feature that, like the "automatically executing" feature of Claim 1, is not taught or suggested by any art of reference, nor any combination of them.

As discussed in detail above, nothing in any cited art teaches or suggests a service provisioning file as claimed, so there is certainly no teaching of automatically executing it in response to receiving it. For purposes of argument, however, Applicants will examine whether anything in Huffman is downloaded to the mobile station and executed in response to receiving it. Examiner Yun again cites to Huffman's claim 1, not present in the Huffman provisional, to support

his rejection of this limitation, so again the Huffman provisional must be examined in detail to determine if it includes any such teaching.

As discussed above, nothing is downloaded or received from Huffman's provisioning database 27 that is described as executable, but the "plug-in modules" can be downloaded from feature services database 29, as described in the Huffman provisional. However, nothing in the Huffman provisional teaches or suggests that any downloaded plug-in module is automatically executed in response to receipt. The Huffman provisional describes that the plug-in modules can be received, extracted, compiled, verified, and stored (see page 11, lines 10-14). The Huffman provisional then teaches that "since the carrier has provisioned the station 5 to operate on the network 3" (see page 11, lines 14-15), "the subscriber can now utilize the station 5 in the normal manner and to take advantage of the selected one or more handset features" (see page 11, lines 15-16. This passage implies that the features provided by any plug-in module are only available when utilized by the subscriber, or manually executed. Certainly there is no teaching or suggestion at all that the plug-in modules are executed in response to being received.

Claim 7

Claim 7 requires: "*wherein said service provisioning file further comprises provisioning data and wherein said main controller uses said provisioning data to configure said mobile station to communicate with said wireless network.*"

The arguments regarding the limitations of parent Claim 6, above, are incorporated herein with regard to Claim 7.

As neither Chang, Huffman, nor the Huffman provisional, nor any other cited reference or combination of them, teaches or suggests the "service provisioning file" as claimed, none of them teaches the additional features of the service provisioning file of Claim 7.

Claim 11

Claim 11 requires:

For use in a wireless network comprising a plurality of base stations, each of the base stations capable of communicating with a plurality of mobile stations, a method of provisioning a first one of the plurality of mobile stations comprising the steps of:

storing in a database a service provisioning file comprising a mobile station service provisioning program in interpreted byte-code format;

determining whether the first mobile station is provisioned;

in response to a determination that the mobile station is unprovisioned, retrieving the service provisioning file from the database; and

transmitting the service provisioning file to the first mobile station, wherein receipt of the service provisioning file causes the first mobile station to automatically execute the mobile station service provisioning program in the service provisioning file, execution of the mobile station service provisioning program automatically provisioning the first mobile station without further interaction from a service operator.

Claim 11, like Claims 1 and 6, requires "*a service provisioning file containing a mobile station service provisioning program in interpreted byte-code format*", not taught or suggested by any art of reference. The arguments made above with respect to Claim 1, with regard to the provisioning program in interpreted byte-code format, apply here as well, and are hereby incorporated with regard to this limitation of Claim 11.

Claim 11, similar to Claim 1, includes "*wherein receipt of the service provisioning file causes the first mobile station to automatically execute the mobile station service provisioning program in the service provisioning file, execution of the mobile station service provisioning program automatically provisioning the first mobile station without further interaction from a service operator.*"

As discussed in detail above, nothing in any cited art teaches or suggests a service provisioning file as claimed, so there is certainly no teaching of automatically executing it or automatically provisioning a mobile station by that execution. For purposes of argument, however, Applicants will examine whether anything in Huffman is downloaded to the mobile station and automatically executed, thereby automatically provisioning the mobile station. Examiner Yun again cites to Huffman's claim 1, not present in the Huffman provisional, to support his rejection of this limitation, so again the Huffman provisional must be examined in detail to determine if it includes any such teaching.

As discussed above, nothing is downloaded or received from Huffman's provisioning database 27 that is described as executable, but the "plug-in modules" can be downloaded by a mobile station already provisioned for service (i.e., whatever "plug-in module" might be received is not received in response to any notification that the mobile station is unprovisioned, as claimed) from feature services database 29, as described in the Huffman provisional. However, nothing in the Huffman provisional teaches or suggests that any downloaded plug-in module is automatically executed after receipt. The Huffman provisional describes that the plug-in modules can be received, extracted, compiled, verified, and stored (see page 11, lines 10-14). The Huffman provisional then teaches that "since the carrier has provisioned the station 5 to operate on the network 3" (see page 11, lines 14-15), "the subscriber can now utilize the station 5 in the normal manner and to take advantage of the selected one or more handset features" (see page 11, lines 15-16. This passage indicates both that the mobile station was already provisioned, so that it is not provisioned automatically in response to receiving the plug-in modules, and also implies that the features provided by any plug-in module are only available when utilized by the subscriber, or manually executed. Certainly there is no teaching or suggestion at all that the plug-in modules are automatically executed.

As such, Claim 11 includes several limitations not taught or suggested by Chang, Huffman, or the Huffman provisional, nor by any other art of record.

Claim 12

Claim 12 requires: "*wherein the service provisioning file further comprises provisioning data used to configure the first mobile station to communicate with the wireless network.*"

The arguments regarding the limitations of parent Claim 11, above, are incorporated herein with regard to this claim.

As neither Chang, Huffman, nor the Huffman provisional, nor any other cited reference or combination of them, teaches or suggests the "service provisioning file" as claimed, none of them teaches the additional features of the service provisioning file of Claim 12.

Ground of Rejection 2: Claims 10, 16, 17 and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Chang and Hoffman in view of Vucetic

Claim 10

Claim 10 requires: "*wherein said mobile station service provisioning program comprises a graphical user interface (GUI) program capable of interacting with a user of said mobile station during said OTA service provisioning process.*"

The arguments regarding the limitations of parent Claim 6, above, are incorporated herein with regard to this claim.

Neither Chang, Huffman, the Huffman provisional, nor Vucetic nor any other cited reference or combination of them, teaches or suggests this feature, particularly not in the context of the parent claim. Examiner Yun references Vucetic col. 7, lines 59-64, which includes mention of WLL GUI 112. In review of all Vucetic's teachings of this element, Vucetic teaches in col. 7, line 38-42, lines 59-64, and col. 8, lines 9-10 that a network management computer includes a GUI interface (the WLL GUI 112) between the user and the network management computer. The GUI described by Vucetic is not part of a mobile station, is not part of the service provisioning program in a mobile station, and does not interact with the user of the mobile station.

Claim 16

Claim 16 requires:

For use in a mobile station capable of communicating with a wireless network, a method of performing an over-the-air (OTA) service provisioning of the mobile station from the wireless network comprising the steps of:

receiving and demodulating forward channel messages from the wireless network;

extracting from the demodulated forward channel messages a service provisioning file containing a mobile station service provisioning program in interpreted byte-code format; and

interpreting and executing the mobile station service provisioning program, wherein execution of the mobile station service provisioning program automatically provisions the mobile station without further interaction from a service operator, wherein the mobile station service provisioning program comprises a graphical user interface (GUI) program capable of interacting with a user of the mobile station during the OTA service provisioning process.

Claim 16, like claims 1, 6, and 11, requires "*a service provisioning file containing a mobile station service provisioning program in interpreted byte-code format*", not taught or suggested by any art of reference. The arguments made above with respect to Claim 1, with regard to the provisioning program in interpreted byte-code format and other distinctions, apply here as well, and are hereby incorporated with regard to this limitation of Claim 16.

As none of the cited art includes a service provisioning program as claimed, none of them teaches or suggests automatically provisioning a mobile station by executing such a service provisioning program.

Neither Chang, Huffman, the Huffman provisional, nor Vucetic nor any other cited reference or combination of them, teaches or suggests the GUI feature of this claim, particularly not in the context of the parent claim. Examiner Yun references Vucetic col. 7, lines 59-64, which includes

mention of WLL GUI 112. In review of all Vucetic's teachings of this element, Vucetic teaches in col. 7, line 38-42, lines 59-64, and col. 8, lines 9-10 that a network management computer includes a GUI interface (the WLL GUI 112) between the user and the network management computer. The GUI described by Vucetic is not part of a mobile station, is not part of the service provisioning program in a mobile station, and does not interact with the user of the mobile station.

Claim 17

Claim 17 requires: "*wherein the service provisioning file further comprises provisioning data used to configure the mobile station to communicate with the wireless network.*"

The arguments regarding the limitations of parent Claim 16, above, are incorporated herein with regard to this claim.

As neither Chang, Huffman, nor the Huffman provisional, nor any other cited reference or combination of them, teaches or suggests the "service provisioning file" as claimed, none of them teaches the additional features of the service provisioning file of Claim 17.

Claim 20

Claim 20 requires "*the step of deleting the service provisioning file from a memory of the mobile station at an end of the service provisioning process.*"

The arguments regarding the limitations of parent Claim 16, above, are incorporated herein with regard to this claim.

Neither Chang, Huffman, the Huffman provisional, Vucetic, nor Weber, nor any other cited reference or combination of them, teaches or suggests this limitation. The passage cited by Examiner Yun, Vucetic's col. 7, line 1-4, concerns deleting call setup parameters after a wireless terminal has gone back "on-hook", and has nothing to do with a service provisioning process or a service provisioning file, as claimed.

Ground of Rejection 3: Claims 3, 4, 8, 9, 13-15, 18 and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Chang, Hoffman, and Vucetic in view of Weber

Claim 3

Claim 3 requires "*wherein said service provisioning file further comprises a stale code generated by said provisioning controller, said stale code indicating a time duration since said service provisioning file was transmitted to said first mobile station.*"

The arguments regarding the limitations of parent Claim 1, above, are incorporated herein with regard to this claim.

Neither Chang, Huffman, the Huffman provisional, Vucetic, nor Weber, nor any other cited reference or combination of them, teaches or suggests the "service provisioning file" as claimed, none of them teaches the additional features of the service provisioning file of Claim 3. Weber includes a teaching relating to determining a time period since the last reception of "mode change information", but has no teaching or suggestion that this time period value is stored in a service provisioning file that meets the limitations of Claim 1.

Claim 4

Claim 4 requires "*said first mobile station transmits said stale code back to said provisioning controller and wherein said provisioning controller prevents said first mobile station from being provisioned if said time duration exceeds a predetermined maximum threshold.*"

The arguments regarding the limitations of parent claims 1 and 3, above, are incorporated herein with regard to this claim.

Neither Chang, Huffman, the Huffman provisional, Vucetic, nor Weber, nor any other cited reference or combination of them, teaches or suggests the "service provisioning file" as claimed, none of them teaches that any stale code within it is transmitted and used as in Claim 4, including Weber's "mode change information".

Claim 8

Claim 8 requires: "*wherein said service provisioning file further comprises a stale code generated by a provisioning controller in said wireless network, said stale code indicating a time duration since said service provisioning file was transmitted to said mobile station.*"

The arguments regarding the limitations of parent Claim 6, above, are incorporated herein with regard to this claim.

Neither Chang, Huffman, the Huffman provisional, Vucetic, nor Weber, nor any other cited reference or combination of them, teaches or suggests the "service provisioning file" as claimed, none of them teaches the additional features of the service provisioning file of Claim 8. Weber includes a teaching relating to determining a time period since the last reception of "mode change information", but has no teaching or suggestion that this time period value is stored in a service provisioning file that meets the limitations of Claim 6.

Claim 9

Claim 9 requires "*wherein said main controller transmits said stale code back to said provisioning controller and wherein said provisioning controller prevents said mobile station from being provisioned if said time duration exceeds a predetermined maximum threshold.*"

The arguments regarding the limitations of parent claims 6 and 8, above, are incorporated herein with regard to this claim.

Neither Chang, Huffman, the Huffman provisional, Vucetic, nor Weber, nor any other cited reference or combination of them, teaches or suggests the "service provisioning file" as claimed, none of them teaches that any stale code within it is transmitted and used as in Claim 9, including Weber's "mode change information".

Claim 13

Claim 13 requires: "*generating a stale code and transmitting the stale code to the first mobile station, the stale code indicating a time at which the service provisioning file was transmitted to the first mobile station.*"

The arguments regarding the limitations of parent Claim 11, above, are incorporated herein with regard to this claim.

Neither Chang, Huffman, the Huffman provisional, Vucetic, nor Weber, nor any other cited reference or combination of them, teaches or suggests the "service provisioning file" as claimed, none of them teaches the additional features of the service provisioning file of Claim 13. Weber includes a teaching relating to determining a time period since the last reception of "mode change information", but has no teaching or suggestion that this time period value indicates anything with relation to a service provisioning file that meets the limitations of Claim 11.

Claim 14

Claim 14 requires "*receiving from the first mobile station a copy of the stale code transmitted back to the wireless network and determining a time duration since the service provisioning file was transmitted to the first mobile station.*"

The arguments regarding the limitations of parent claims 13 and 11, above, are incorporated herein with regard to this claim.

Neither Chang, Huffman, the Huffman provisional, Vucetic, nor Weber, nor any other cited reference or combination of them, teaches or suggests the stale code used and transmitted as claimed, none of them teaches that any stale code is transmitted back to the network and used as in Claim 14, including Weber's "mode change information".

Claim 15

Claim 15 requires "*determining if the time duration exceeds a predetermined maximum*

threshold and preventing the first mobile station from being provisioned if the time duration exceeds the predetermined maximum threshold."

The arguments regarding the limitations of parent claims 14, 13 and 11, above, are incorporated herein with regard to this claim.

Neither Chang, Huffman, the Huffman provisional, Vucetic, nor Weber, nor any other cited reference or combination of them, teaches or suggests the stale code used and transmitted as claimed, nor using such a stale code to prevent provisioning as in Claim 14, including Weber's "mode change information".

Claim 18

Claim 18 requires: "*wherein the service provisioning file further comprises a stale code generated by the wireless network, the stale code indicating a time at which the service provisioning file was transmitted to the mobile station.*"

The arguments regarding the limitations of parent claims 17 and 16, above, are incorporated herein with regard to this claim.

Neither Chang, Huffman, the Huffman provisional, Vucetic, nor Weber, nor any other cited reference or combination of them, teaches or suggests the "service provisioning file" as claimed, none of them teaches the additional features of the service provisioning file of Claim 18. Weber includes a teaching relating to determining a time period since the last reception of "mode change information", but has no teaching or suggestion that this time period value is stored in a service provisioning file that meets the limitations of Claim 16.

Claim 19

Claim 19 requires "*further comprising the step of transmitting the stale code back to the wireless network.*"

The arguments regarding the limitations of parent claims 18, 17, and 16, above, are incorporated herein with regard to this claim.

Neither Chang, Huffman, the Huffman provisional, Vucetic, nor Weber, nor any other cited reference or combination of them, teaches or suggests the stale code used and transmitted as claimed, none of them teaches that any stale code is transmitted back to the network and used as in Claim 19, including Weber's "mode change information".

Motivation to Combine or Modify[2]

Examiner Yun includes cursory "motivation" statements as a part of his final Office Action. However, each of these statements assumes that the combined references each include a teaching relevant to the claim limitations. As has been shown in detail above, each of the references completely fails to teaches or suggests one or more of the features for which it is cited. As the

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[2]Where an obviousness rejection is based on a combination of references, the Examiner must show that one of ordinary skill would have been motivated to combine those references. *See In re Nilssen*, 7 USPQ2d 1500 (Fed.Cir. 1988); *Panduit Corp. v. Dennison Mfg. Co.*, 1 USPQ2d 1593, 1597 (Fed.Cir. 1987); *ACS Hospital Systems v. Montefiore Hospital*, 220 USPQ 929 (Fed.Cir. 1984).

"When prior art references require selective combination ... to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself.... Something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination." *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 5 USPQ2d 1434, 1438 (Fed.Cir. 1988), *quoting Interconnect Planning Corp. v. Feil*, 227 USPQ 543 (Fed.Cir. 1985), *and Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick*, 221 USPQ 481 (Fed.Cir. 1984).

"While *[a reference]* may be capable of being modified to run the way *[the applicant's]* apparatus is claimed, there must be a suggestion or motivation in the reference to do so. See In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984) ("The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification."). *In re Mills,* 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed.Cir. 1990).

references do not include the teachings on which the stated motivations are based, the stated motivations are similarly erroneous.

Grouping of Claims

The claims on appeal do not stand or fall together, as may be seen from the arguments set forth below. Each claim has been argued separately under a separate subheading, and each claim should be considered separately. While the Applicants recognize that a formal statement regarding the grouping of claims is no longer required, each claim should be considered separately; or at the very least each claim which is argued separately in the preceding sections of this brief should be considered separately. Argument: The fact that the claims use different formulations (as detailed above) and/or have been argued separately, shows that, if their patentability is not considered separately, any adverse decision would show that the limitations of some claims had been unfairly ignored.

REQUESTED RELIEF

The Board is respectfully requested to reverse the outstanding rejections and return this application to the Examiner for allowance.

Respectfully submitted,
DAVIS MUNCK, P.C.

Date: 22 August 2005

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Attorney for Applicant

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Bryan J. Moles, et al.
Serial No.:	09/542,632
Filed:	April 4, 2000
For:	SYSTEM AND METHOD FOR PROVISIONING OR UPDATING A MOBILE STATION USING OVER-THE-AIR TRANSFER OF INTERPRETED BYTE-CODE PROGRAM
Group No.:	2682
Examiner:	Eugene Yun

APPENDIX A -

Claims Appendix

1. (Previously Presented) For use in a wireless network comprising a plurality of base stations, each of said base stations capable of communicating with a plurality of mobile stations, a service provisioning system capable of provisioning a first one of said plurality of mobile stations comprising:

a database capable of storing a service provisioning file comprising a mobile station service provisioning program in interpreted byte-code format; and

a provisioning controller coupled to said database capable of receiving a notification indicating that said first mobile station is unprovisioned and further capable, in response to receipt of said notification, of retrieving said service provisioning file from said database and transmitting said service provisioning file to said first mobile station, wherein receipt of said service provisioning file causes said first mobile station to automatically execute said mobile station service provisioning program in said service provisioning file, execution of said mobile station service provisioning program automatically provisioning said first mobile station without further interaction from a service operator.

2. (Original) The service provisioning system as set forth in Claim 1 wherein said service provisioning file further comprises provisioning data used to configure said first mobile station to communicate with said wireless network.

3. (Original) The service provisioning system as set forth in Claim 1 wherein said service provisioning file further comprises a stale code generated by said provisioning controller, said stale code indicating a time duration since said service provisioning file was transmitted to said first mobile station.

4. (Original) The service provisioning system as set forth in Claim 3 wherein said first mobile station transmits said stale code back to said provisioning controller and wherein said provisioning controller prevents said first mobile station from being provisioned if said time duration exceeds a predetermined maximum threshold.

5. (Original) The service provisioning system as set forth in Claim 1 further comprising a security apparatus capable of determining that said first mobile station is unprovisioned and, in response to said determination, generating and transmitting said notification to said provisioning controller.

6. (Previously Presented) A mobile station capable of being provisioned from a wireless network by an over-the-air (OTA) service provisioning process, said mobile station comprising:

an RF transceiver capable of receiving and demodulating forward channel messages from said wireless network and further capable of modulating and transmitting reverse channel messages to said wireless network; and

a main controller capable of receiving said demodulated forward channel messages from said RF transceiver and extracting therefrom a service provisioning file containing a mobile station service provisioning program in interpreted byte-code format, wherein said main controller, in response to receipt of said service provisioning file, is capable of interpreting and executing said mobile station service provisioning program, execution of said mobile station service provisioning program automatically provisioning said mobile station without further interaction from a service operator.

7. (Original) The mobile station as set forth in Claim 6 wherein said service provisioning file further comprises provisioning data and wherein said main controller uses said provisioning data to configure said mobile station to communicate with said wireless network.

8. (Original) The mobile station as set forth in Claim 6 wherein said service provisioning file further comprises a stale code generated by a provisioning controller in said wireless network, said stale code indicating a time duration since said service provisioning file was transmitted to said mobile station.

9. (Original) The mobile station as set forth in Claim 8 wherein said main controller transmits said stale code back to said provisioning controller and wherein said provisioning controller prevents said mobile station from being provisioned if said time duration exceeds a predetermined maximum threshold.

10. (Previously Presented) The mobile station as set forth in Claim 6 wherein said mobile station service provisioning program comprises a graphical user interface (GUI) program capable of interacting with a user of said mobile station during said OTA service provisioning process.

11. (Previously Presented) For use in a wireless network comprising a plurality of base stations, each of the base stations capable of communicating with a plurality of mobile stations, a method of provisioning a first one of the plurality of mobile stations comprising the steps of:

storing in a database a service provisioning file comprising a mobile station service provisioning program in interpreted byte-code format;

determining whether the first mobile station is provisioned;

in response to a determination that the mobile station is unprovisioned, retrieving the service provisioning file from the database; and

transmitting the service provisioning file to the first mobile station, wherein receipt of the service provisioning file causes the first mobile station to automatically execute the mobile station service provisioning program in the service provisioning file, execution of the mobile station service provisioning program automatically provisioning the first mobile station without further interaction from a service operator.

12. (Original) The method as set forth in Claim 11 wherein the service provisioning file further comprises provisioning data used to configure the first mobile station to communicate with the wireless network.

13. (Original) The method as set forth in Claim 11 further comprising the steps of generating a stale code and transmitting the stale code to the first mobile station, the stale code indicating a time at which the service provisioning file was transmitted to the first mobile station.

14. (Original) The method as set forth in Claim 13 further comprising the steps of receiving from the first mobile station a copy of the stale code transmitted back to the wireless network and determining a time duration since the service provisioning file was transmitted to the first mobile station.

15. (Original) The method as set forth in Claim 14 further comprising the steps of determining if the time duration exceeds a predetermined maximum threshold and preventing the first mobile station from being provisioned if the time duration exceeds the predetermined maximum threshold.

16. (Previously Presented) For use in a mobile station capable of communicating with a wireless network, a method of performing an over-the-air (OTA) service provisioning of the mobile station from the wireless network comprising the steps of:

receiving and demodulating forward channel messages from the wireless network;

extracting from the demodulated forward channel messages a service provisioning file containing a mobile station service provisioning program in interpreted byte-code format; and

interpreting and executing the mobile station service provisioning program, wherein execution of the mobile station service provisioning program automatically provisions the mobile station without further interaction from a service operator, wherein the mobile station service provisioning program comprises a graphical user interface (GUI) program capable of interacting with a user of the mobile station during the OTA service provisioning process.

17. (Previously Presented) The method as set forth in Claim 16 wherein the service provisioning file further comprises provisioning data used to configure the mobile station to communicate with the wireless network.

18. (Previously Presented) The method as set forth in Claim 17 wherein the service provisioning file further comprises a stale code generated by the wireless network, the stale code indicating a time at which the service provisioning file was transmitted to the mobile station.

19. (Original) The method as set forth in Claim 18 further comprising the step of transmitting the stale code back to the wireless network.

20. (Original) The method as set forth in Claim 16 further comprising the step of deleting the service provisioning file from a memory of the mobile station at an end of the service provisioning process.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Bryan J. Moles, et al.
Serial No.:	09/542,632
Filed:	April 4, 2000
For:	SYSTEM AND METHOD FOR PROVISIONING OR UPDATING A MOBILE STATION USING OVER-THE-AIR TRANSFER OF INTERPRETED BYTE-CODE PROGRAM
Group No.:	2682
Examiner:	Eugene Yun

APPENDIX B -
Copy of Formal Drawings

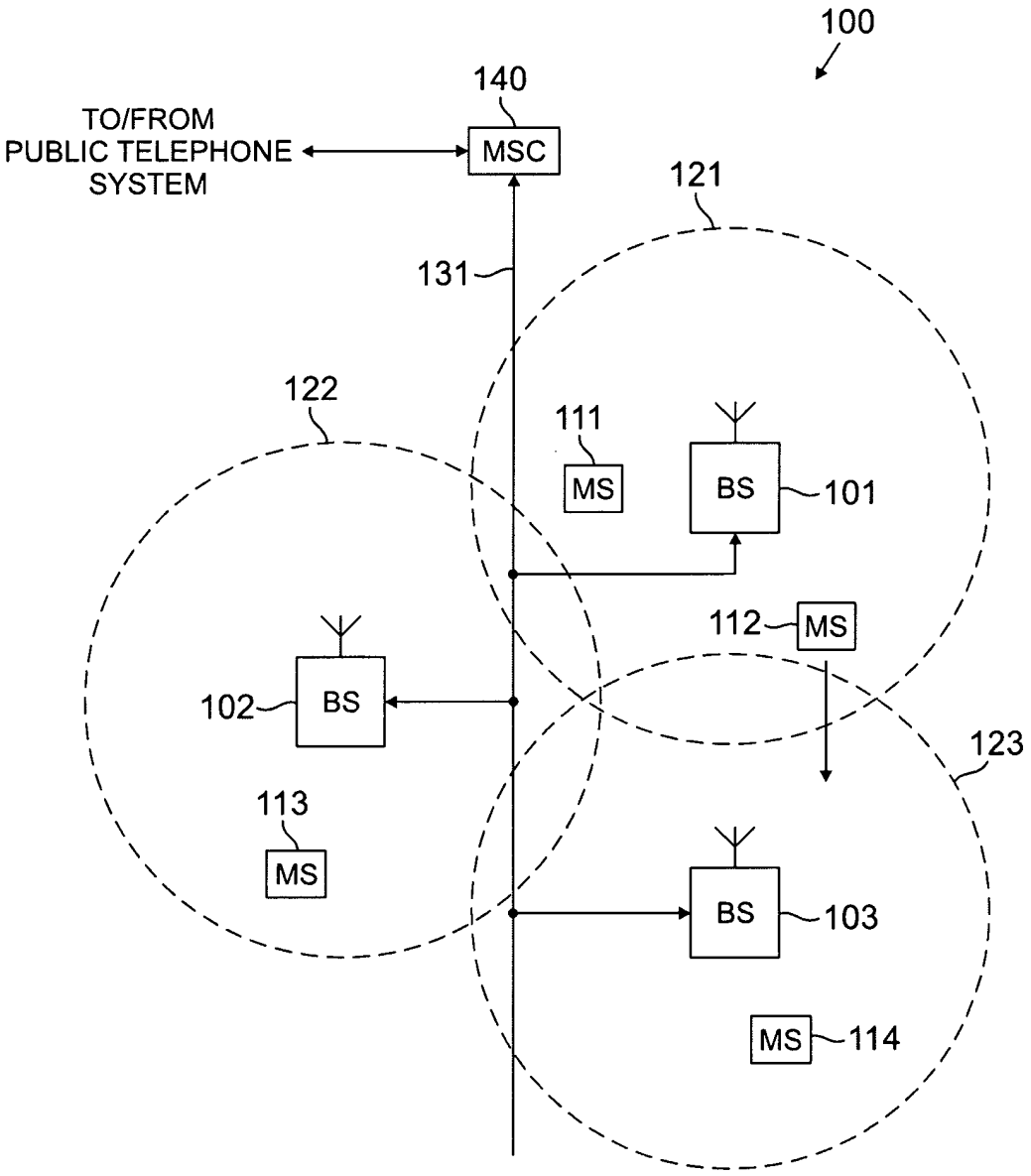
100
140
TO/FROM
PUBLIC TELEPHONE
SYSTEM
MSC
121
131
122
111
MS
BS
101
112
MS
102
BS
123
113
MS
BS
103
MS
114

FIG. 1

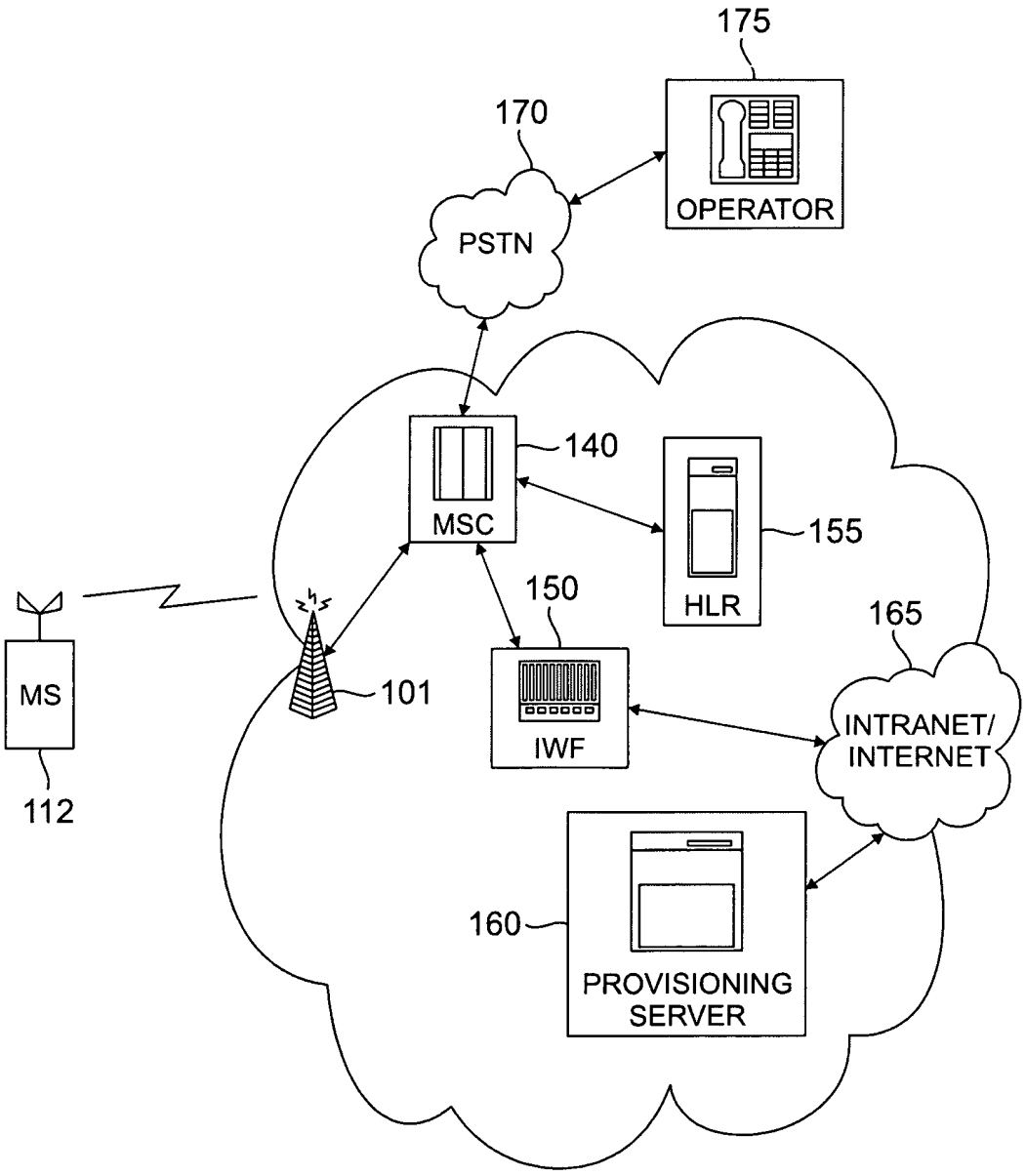
175
OPERATOR
170
PSTN
140
MSC
155
HLR
150
165
MS
101
IWF
INTRANET/
INTERNET
112
160
PROVISIONING
SERVER

FIG. 2

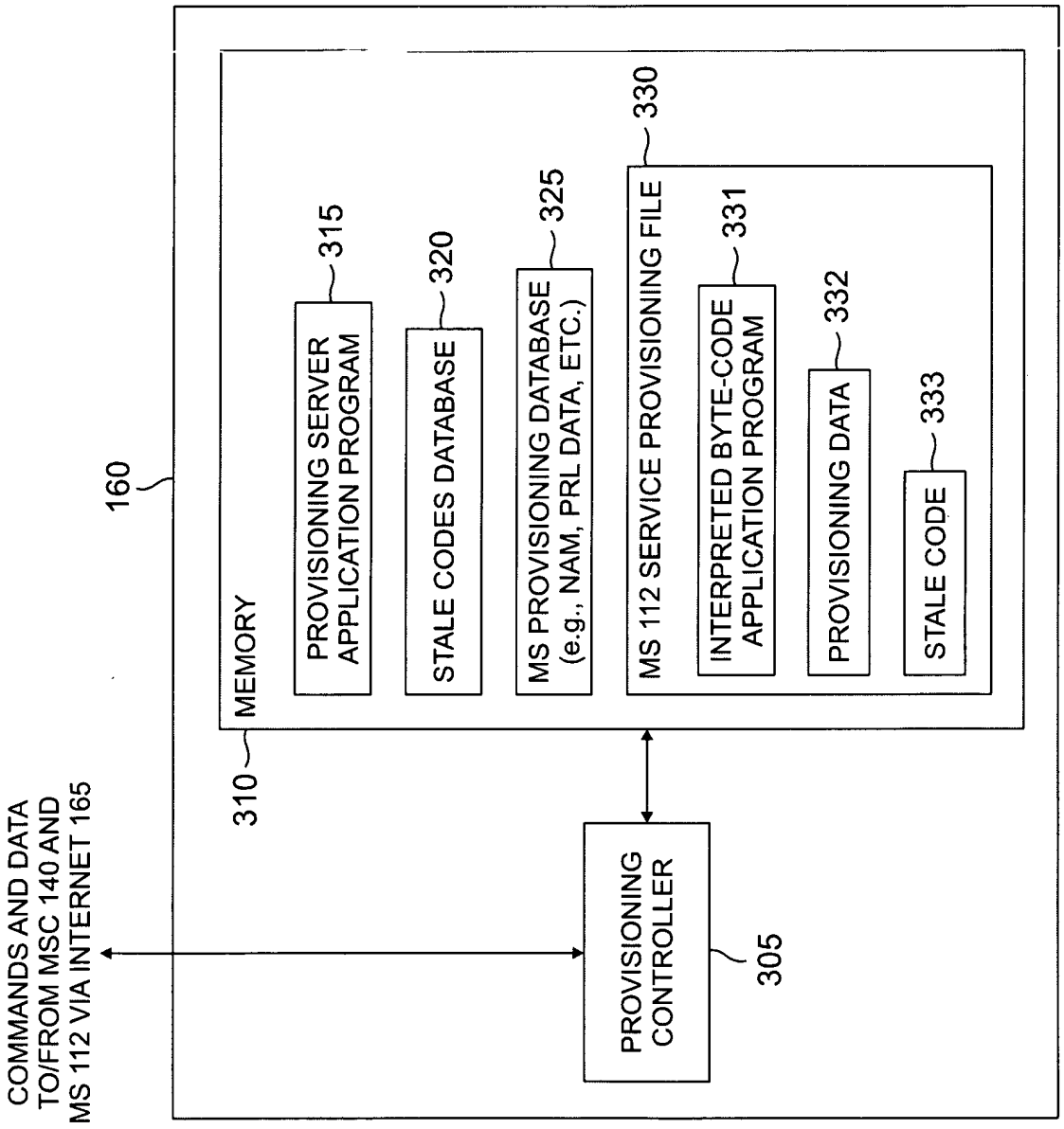
COMMANDS AND DATA
TO/FROM MSC 140 AND
MS 112 VIA INTERNET 165
160
MEMORY
310
PROVISIONING SERVER APPLICATION PROGRAM
315
STALE CODES DATABASE
320
MS PROVISIONING DATABASE (e.g., NAM, PRL DATA, ETC.)
325
MS 112 SERVICE PROVISIONING FILE
330
INTERPRETED BYTE-CODE APPLICATION PROGRAM
331
PROVISIONING DATA
332
STALE CODE
333
PROVISIONING CONTROLLER
305

FIG. 3

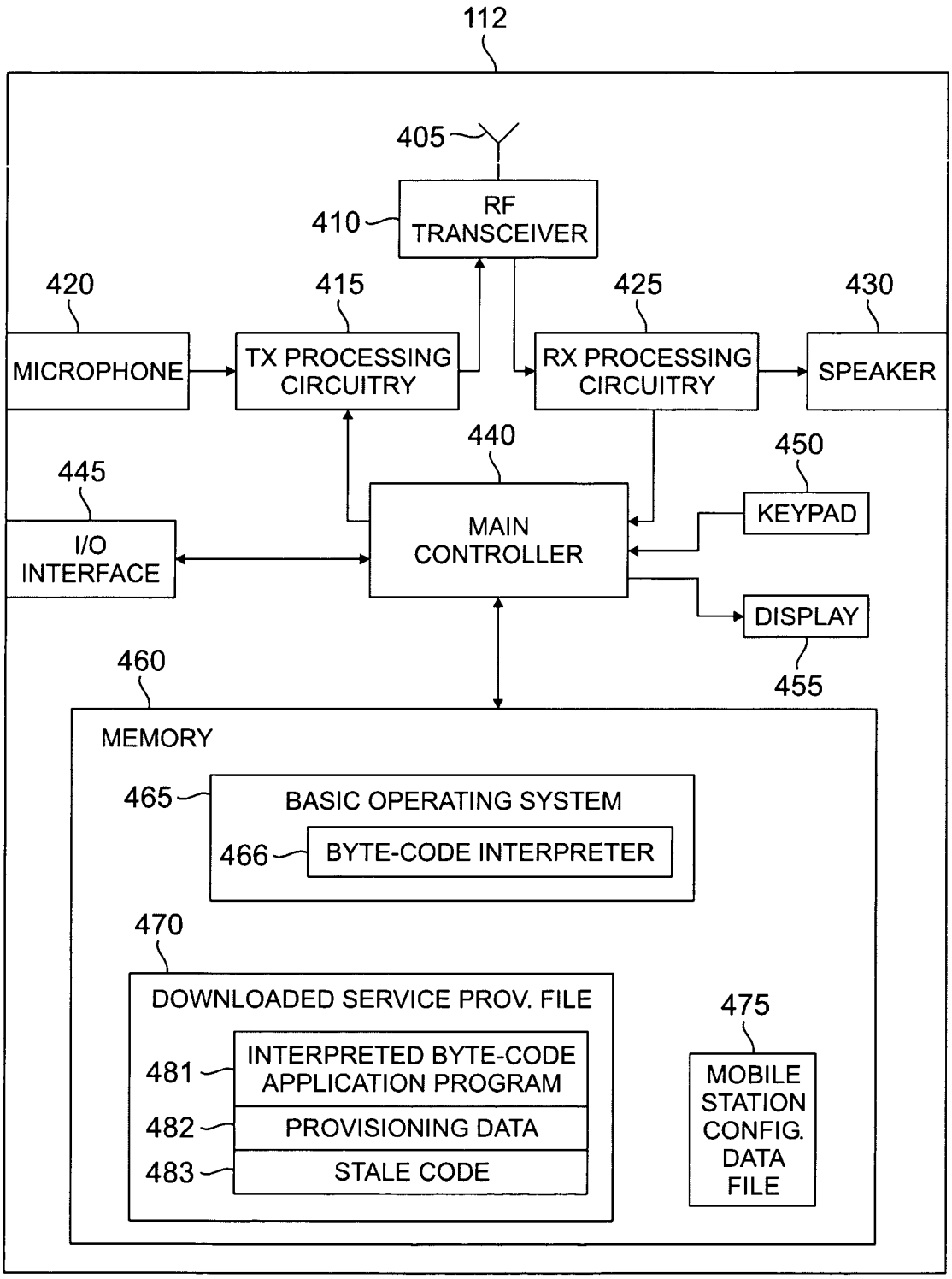
112
405
RF TRANSCEIVER
410
420
415
425
430
MICROPHONE
TX PROCESSING CIRCUITRY
RX PROCESSING CIRCUITRY
SPEAKER
440
450
445
KEYPAD
I/O INTERFACE
MAIN CONTROLLER
DISPLAY
455
460
MEMORY
465
BASIC OPERATING SYSTEM
466
BYTE-CODE INTERPRETER
470
DOWNLOADED SERVICE PROV. FILE
475
481
INTERPRETED BYTE-CODE APPLICATION PROGRAM
482
PROVISIONING DATA
483
STALE CODE
MOBILE STATION CONFIG. DATA FILE

FIG. 4

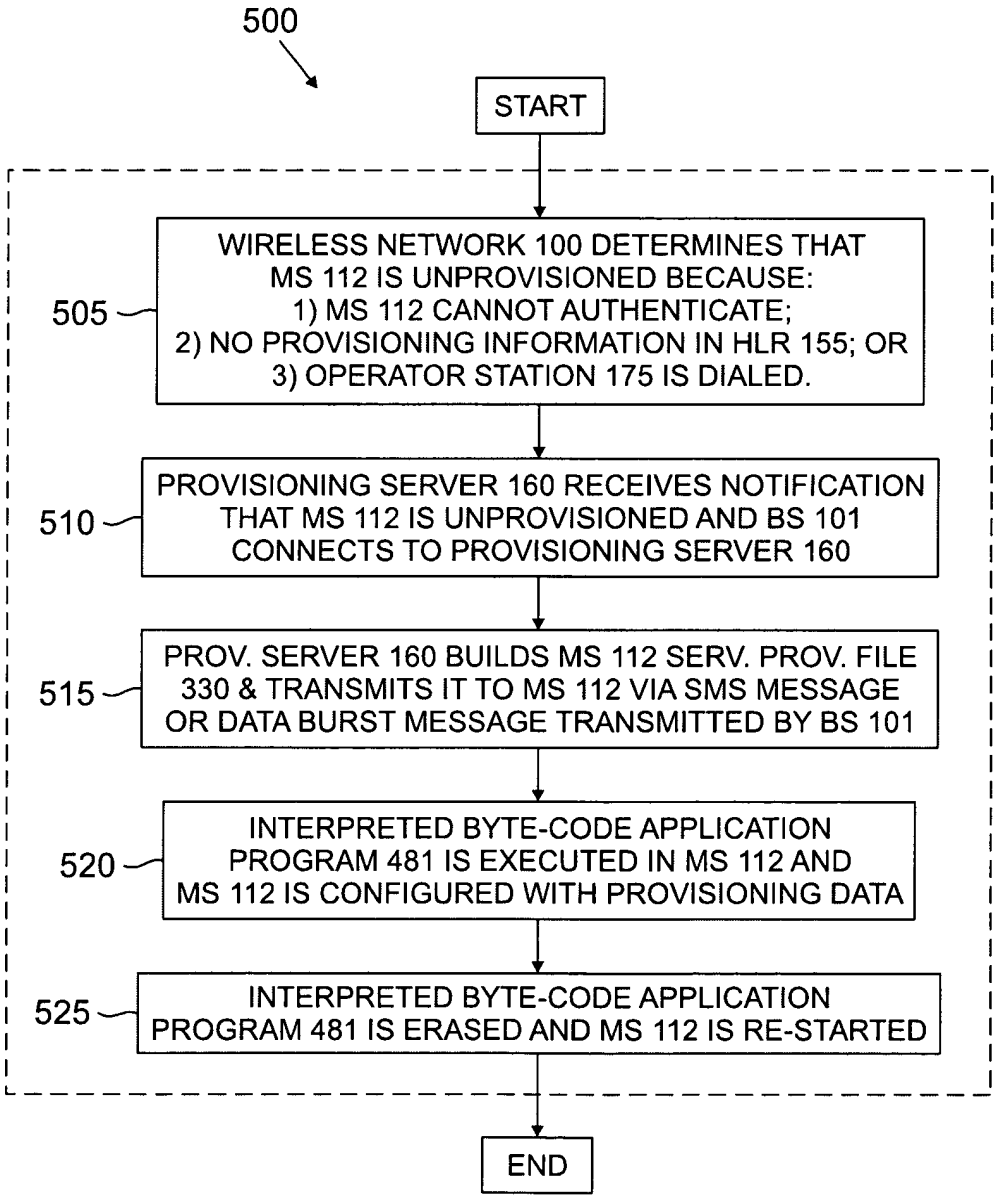
500
START
WIRELESS NETWORK 100 DETERMINES THAT MS 112 IS UNPROVISIONED BECAUSE: 1) MS 112 CANNOT AUTHENTICATE; 2) NO PROVISIONING INFORMATION IN HLR 155; OR 3) OPERATOR STATION 175 IS DIALED.
505
PROVISIONING SERVER 160 RECEIVES NOTIFICATION THAT MS 112 IS UNPROVISIONED AND BS 101 CONNECTS TO PROVISIONING SERVER 160
510
PROV. SERVER 160 BUILDS MS 112 SERV. PROV. FILE 330 & TRANSMITS IT TO MS 112 VIA SMS MESSAGE OR DATA BURST MESSAGE TRANSMITTED BY BS 101
515
INTERPRETED BYTE-CODE APPLICATION PROGRAM 481 IS EXECUTED IN MS 112 AND MS 112 IS CONFIGURED WITH PROVISIONING DATA
520
INTERPRETED BYTE-CODE APPLICATION PROGRAM 481 IS ERASED AND MS 112 IS RE-STARTED
525
END

FIG. 5

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Serial No.:	09/542,632
Filed:	April 4, 2000
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Group No.:	2682
Examiner:	Eugene Yun

APPENDIX C -

Copy of Provisional Application 60/185,131

A/PKGV

JC553 U.S. PTO 60/185131 02/25/00

JC685 U.S. PTO 02/25/00

PROVISIONAL APPLICATION COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION under 37 CFR 1.53(b)(2).

Docket Number	50108-042	Type a plus sign (+) inside this box →	+

INVENTOR/APPLICANT

LAST NAME	FIRST NAME	MIDDLE INITIAL	RESIDENCE (City and Either State or Foreign Country)
HOFFMAN	Ted	L.	Camp Hill, PA

TITLE OF THE INVENTION (280 characters max)

OVER-THE-AIR PROGRAMMING OF WIRELESS TERMINAL FEATURES

CORRESPONDENCE ADDRESS

McDERMOTT, WILL & EMERY
600 13th Street, N.W.
Washington, DC 20005-3096
(202) 756-8000

STATE	Washington, D.C.	ZIP CODE	20005-3096	COUNTRY	USA

ENCLOSED APPLICATION PARTS *(check all that apply)*

- ☒ Specification — *Number of pages* [17]
- ☒ Drawings — *Number of sheets* [4]
- ☐ Small Entity Statement
- ☐ Other (specify):

METHOD OF PAYMENT *(check one)*

- ☐ A check or money order is enclosed to cover the Provisional filing fees
- ☒ The Commissioner is hereby authorized to charge filing fees and credit Deposit Account Number: 500417

PROVISIONAL FILING FEE AMOUNT ($): $150.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

- ☒ No.
- ☐ Yes, the name of the U.S. Government agency and the Government contract number are:

☐ Additional inventors are being named on separately numbered sheets attached hereto.

Respectfully submitted,

MCDERMOTT, WILL & EMERY

Keith E. George
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Date: February 25, 2000
Facsimile: (202) 756-8087

50108-042

OVER-THE-AIR PROGRAMMING OF WIRELESS TERMINAL FEATURES

Field of the Invention

The concepts involved in the present invention relate to a new approach to the manufacture, sale and distribution of wireless communication terminals, such as digital cellular telephones, and the special functions and features for such devices.

Background

Mobile communication is becoming increasingly popular, particularly for voice-grade telephone services, and more recently for data communication services. As a result, there is an increasing demand for development of communication terminals with ever more sophisticated features. Even a low-end model of a digital cellular telephone will include caller identification capability, a large speed-dial list, called and calling party phone number lists, etc.

At present, manufacturers build the wireless terminal devices with a complete set of hardware and read-only software to support a full set of desired features. Development of a new wireless telephone currently takes about 18 months, from initial feature specification to first street-sale. Costs of development of new models of cellular telephones, with ever more sophisticated features are high and continue to spiral upward.

At the same time, driven by a long decline in consumer electronic prices, the price that the market will bear for such telephones has remained steady or even declined, in spite of the high demand. As a result, the margin on each telephone or terminal unit made and sold by a manufacturer is extremely small, sometimes only a few dollars a unit. The resellers, typically cellular carriers or their agents, sell the terminal units at a loss, as a form of subsidy or discount, to encourage customers to subscribe to and use their cellular network services.

Some capability exists today to download service-related information to digital cellular telephones. However, this capability has been limited to data needed to provision a new unit or to provision an existing unit for a new service. During initial provisioning, for example, the

carrier downloads the mobile identification number assigned to the unit. Essentially, these downloading techniques turn on or off available features by setting bits to toggle features on/off or by loading necessary control data. However, the feature functionality desired must already be present in the unit as manufactured and sold to the user. If the user desires a new feature that an existing unit does not support, the user still must discard the old unit and purchase a new unit that can support the desired feature.

Summary of the Invention

The invention alleviates the above noted problems in development and distribution of wireless terminal devices with new features. Essentially, the manufacturer will develop and sell a terminal device having predetermined communication capabilities and a minimal operation capability. However, the unit will include a substantial memory for plug-in feature programming. After sale to an end user, the end user selects a desired feature or set of features and contacts a service provider. The provider may be the carrier operating the network that the user subscribes to, the manufacturer or an independent third party. The user obtains software programming from the service provider, which is then loaded into the memory of the terminal device.

The downloaded software is essentially a plug-in software module, written to the application program interface specification of the core software of the terminal device. When loaded into memory, the core software together with the plug-in module implements the desired feature(s). Features can be added, upgraded or replaced virtually at any time by downloading new feature modules into the memory to add to or over-write those previously downloaded into the terminal.

The manufacturer or other parties can upgrade units simply by writing new software. The manufacturer can sell the units for a set price, which may be small. However, the later sales of the features provide an additional revenue stream.

From the end users' perspective, they can obtain exactly the set of features that they desire. Also, there can be competition for writing the best software, for at least some features. For example, if a third party offers a better voice-recognition dialer module than that available from the carrier or the manufacturer, the user may opt to buy that software from the third party.

The downloading of the software into the wireless terminal device may utilize a variety of available technologies. For example, a data port on the terminal may be temporarily connected to a computer or to a disk or card reader and the software plug-in modules transferred into memory through the part. Preferably, the software downloading utilizes an over-the-air transfer.

The minimal capability of the base-line terminal device enables the device to establish a wireless link through the carrier's network to a data system. For network-related features and/or initial provisioning, this data system would be a private system operated by the carrier. The data system would send at least one software module containing the executable program necessary to allow the particular type of terminal to implement one or more features selected by the individual user.

In a preferred embodiment, the base-line functionality of the terminal implements a wireless web browser. The initial data communication would provide web pages for display on the terminal and allow the user to select packages of features and/or individual features from those available from the carrier. Upon selection and agreement to payment, a server would transmit the module(s) for the selected features through the network and over-the-air to the user's wireless terminal device. The terminal would check the integrity of the received module and load the software into flash memory. Once loaded, the terminal would execute the software, as needed to allow the user access to the selected service features. The user could initiate similar procedures to obtain other feature modules later, from the carrier directly, from the manufacturer or from a third party.

Additional objects, advantages and novel features of the invention will be set forth in part in the description which follows, and in part will become apparent to those skilled in the art upon examination of the following or may be learned by practice of the invention.

Brief Description of the Drawings

The drawing figures depict the present invention by way of example, not by way of limitations. In the figures, like reference numerals refer to the same or similar elements.

Fig. 1 is a process diagram useful in explaining the distribution of wireless terminals and associated feature programming, in accord with the present invention.

Fig. 2 is a simplified block diagram of a public wireless telephone network useful in explaining operations in accord with the invention.

Fig. 3 is a functional block diagram of an exemplary wireless telephone station capable of implementing the inventive feature programming.

Fig. 4 is a front plan view of the exemplary wireless telephone station.

Fig. 5 is a logical block diagram, useful in explaining the organization of the software within a terminal device implementing the present invention.

Detailed Description of the Presently Preferred Embodiments

The present invention involves a new business model for development and distribution of new features for cellular telephones and other types of wireless communication terminals. Fig. 1 shows the process flow, for distribution of the terminal devices and feature software in accord with the invention. In the illustrated example, the wireless terminals are digital cellular telephones 5, although the inventive methodology may apply to other types of wireless terminal devices.

Initially, the manufacturer develops and produces digital cellular telephone stations 5. Each station includes all hardware necessary to implement standard cellular telecommunication functions as well as a wide range of features desired by users of such stations. Each station 5 includes program memory, which can be logically considered as two sections M1 and M2. The first section M1 contains core programming software, that is to say the minimum kernel of software necessary to implement the base-line functionality of the wireless station 5. As discussed more later, this software enables voice and data communication over the wireless air-link interface. These communications at the base-line level may point to specific destinations, for example to enable provisioning and initial feature selection. The programming in memory section M1 also implements at least a minimal user interface. Preferably, the software implements some form of graphical user interface (GUI) designed for wireless terminals, such as a wireless web browser.

The second section of memory M2 is designed for storage of plug-in feature programs or modules. However, when initially manufactured, the memory section M2 is blank. The manufacturer sells the stations 5, with the blank memory section M2 to the carrier (at S1), and

the carrier sells or otherwise distributes the terminals to its subscribers (at S2). When a subscriber first receives the cellular telephone 5, the section M2 of the memory for the plug-in feature modules is still blank. The core programming in memory section M2, however, enables the subscriber to make at least some communications using the station 5.

In a preferred embodiment, the subscriber with the new cellular station 5 would use the station to contact the carrier and or certain data systems operated by the carrier. This is analogous to an initial communication utilized to provision the station 5 on the carrier's network and typically would coincide with the provisioning process. In step S3A the subscriber communicates feature selections to the carrier. At some point, the subscriber may communicate certain feature selections to the manufacturer (S3B). Data systems of the carrier and/or the manufacturer will transmit one or more plug-in software modules to the station 5. The subscriber could receive a hard media of some type, such as a disk or card, and use some direct coupling to transfer the plug-ins to the station. In the illustrated example, however, the data systems of the carrier and/or the manufacturer transmit the plug-in(s) through the cellular network and thus over the air-link to the station 5 (step S4A and/or step S4B).

The programming initially resident in the station 5 will enable the station hardware to check the received feature programming modules to insure that each plug-in was completely received and/or to correct any errors in data transmission. When the station has verified that a plug-in was correctly and completely received, it loads the module into a part of the second memory section M2. Hence, after completion of the download procedure (S4A and/or S4B), the section M2 will contain one or more feature plug-in modules as shown. The carrier also has provisioned the station on the network by this time, therefore the subscriber can utilize the station in the normal manner. Of particular note, the station 5 can now perform all operations necessary to implement the particular features selected by the subscriber.

The carrier will often obtain the software plug-in modules for various features from the manufacturer(s) of the stations 5. However, the carrier may write its own programming or obtain some plug-ins from other sources.

The inventive concepts also encompass downloading feature software for the station 5 from third party sources. For example, the manufacturer may offer a voice processing plug-in module for voice activated automatic dialing from the station 5. A third party, however, may offer a competing plug-in product. The competing product may be better or cheaper or more

desirable for some other reason. Alternatively, the third party may offer a feature for the station that neither the carrier nor the manufacturer offers. In any such a case, the subscriber can initiate a communication to a data system or server 37 operated by the third party programmer and indicate a desire to select a feature from that provider (S5). The server 37 transmits the selected plug-in(s) to the station 5 (step S6), preferably through the cellular network and thus over the air-link. After reception and error checking, the plug-in is loaded and the subscriber can utilize the new feature in the same manner as for the feature software downloaded from the carrier or the manufacturer.

As shown by the loop as S7, the various process steps of selecting features and downloading plug-in modules may be repeated any number of times. The subscriber may elect to repeat the process with any of the three providers, for example to obtain software upgrades for selected features, to select and obtain software for new features, etc.

Aspects of the invention relate to the methodology for distributing the terminal stations and software, to the stations themselves, to the software, as well as to the networks and systems involved. To insure a complete understanding of these various inventive concepts, it may be helpful to discuss examples of these various elements in somewhat more detail. Consider first a network implementing the feature programming in accord with the invention and providing a variety of services using stations programmed in accord with the invention.

Fig. 1 depicts a system for providing voice telephone communications as well as data communication services. Although the invention may apply to other types of wireless networks, as shown, a wireless telephone network 3 provides cellular or personal communications service (PCS) type services to mobile stations depicted by way of example as mobile handsets 5. The network 3 enables users of the mobile stations 5 to initiate and receive telephone calls to each other as well as through the public switched telephone network (PSTN) 7 to landline telephones 9.

The network 3 includes a number of mobile switching centers (MSCs) 11, one of which appears in the drawing for simplicity of illustration. Each MSC 11 connects through trunk circuits to a number of base stations 13, which the MSC controls. Through the MSC 11 and the base stations 13, the network 3 provides voice-grade digital telephone services over the common air interface to and from the mobile stations 5. The network elements also may provide data services over the logical communication channels, as discussed more later.

The mobile stations 5, the MSCs 11 and the base stations 13 implement one or more standard air-link interfaces. For example, the wireless telephone network 3 may support dual-mode services. Although not shown separately, such a dual-mode network includes wireless telephone components that output analog telephone signals for transmission according to an analog wireless protocol (e.g., AMPS) as well as digital wireless system components that operate in accord with a digital wireless protocol, for example the CDMA protocol IS-95. The base stations may provide both types of services. Alternatively, the network may comprise base stations that send and receive voice and signaling traffic according to the prescribed analog protocol as well as digital base stations that utilize the digital wireless protocol. Each dual-mode MSC typically includes a switching subsystem for analog telephone services, a switching subsystem for digital telephone services, and a control subsystem. Other MSCs may implement only one type of service.

Digital wireless equipment is available today to support any one of several common interface standards, including time division multiple access (TDMA) and the Global System for Mobile communications (GSM). In the preferred embodiment, the digital wireless telephone components support the code division multiple access (CDMA) standards.

With CDMA, each transmitted signal comprises a different pseudorandom binary sequence, also referred to as a pseudonoise (PN) sequence, which modulates a carrier signal, spreading the spectrum of the waveform. Thus, since each CDMA subscriber unit is assigned a unique PN code, a plurality of subscriber stations can send and receive CDMA signals sharing the same frequency spectrum. If these CDMA signals were viewed in either the frequency or time domain, the multiple access signals would appear to be superimposed on top of each other. The CDMA signals are separated in the receivers of the base stations or the subscriber stations by using a correlator which accepts only signal energy from the selected binary PN sequence and despreads its spectrum. The CDMA signals from other sources, whose codes do not match the selected binary PN sequence, are not despread in bandwidth and as a result, contribute only to the background noise and represent a self-interference generated by the system.

As will be familiar to those of ordinary skill, an air-link interface for each cellular service in a geographic area includes paging channels and/or signaling channels, as well as actual communications channels for voice and/or data services. The channels may be separate frequency channels, or the channels may be logically separated, for example based on time

division or code division. The paging and signaling channels are used for preliminary coded communications between a cellular telephone and a cell site in setting up a telephone call or other session, after which a communication channel is assigned or set up for the telephone's use on that call.

The wireless network 3 includes a home location register (HLR) 15 that stores subscriber profiles for each of the wireless subscribers and their associated digital wireless telephones 5. The HLR 15 may reside in the home MSC 11 or in a centralized service control point that communicates with the MSC(s) via an out-of-band signaling system such as an SS7 network. As recognized in the art, the HLR 15 stores for each mobile subscriber the subscriber's mobile telephone number, the mobile identification number, and information specifying the wireless services subscribed to by the mobile subscriber, such as numeric paging or text-based paging, data communication services, etc.

The carrier also operates a number of different systems in one or more customer service centers 17. These include one or more billing systems, network provisioning systems such as the MTAS system, client account administration systems, and the like. The billing system, for example, receives usage and operations data from the MSCs 11 and processes that data to generate bills for individual customers and to forward data regarding users roaming through the carrier's service area through a clearinghouse (not shown) for reconciliation. The MTAS provides data to the HLR 15 and/or to the MSCs 11 to provision services for new stations 15 and modify provisioning data as customers change there subscriptions to obtain different sets of services from the carrier.

In the more advanced implementations of cellular networks, such as the network 3, the carrier provides data communication services in addition to voice-grade telephone services. For example, the network 3 may include interworking function (IWF) equipment 19. This equipment provides a multi-call interface to communication links from the MSC 11 and typically implements a firewall function. In this manner, the IWF equipment essentially looks like a dial-up interface to a data network such the public packet-switched network now commonly known as the Internet 21. The Internet access enables users to access any equipment coupled to the Internet, virtually anywhere in the world. As discussed more later, one consequence is that a user of the station 5 can access a server 37 of an independent supplier of feature programming for the handset 5, such as the manufacturer or a third party.

As part of the provisioning of a new digital cellular telephone station 5, it is necessary to download certain data into the new station 5. To automate this procedure, the carrier operates an over-the-air (OTA) provisioning server 25. A provisioning database 27 stores data sets necessary to provision stations for the various services offered through the network 3 as well as a data table of all stations 5 served through the network 3 and the services currently provided to each station. When the new station first comes on-line, the customer service center 17 will establish a record for that station 5 in the provisioning database 27.

The provisioning database 27 is accessible by the OTA application server 25. The database 27 may be a program run on the sever computer or it may reside in a separate computer in communication with the server 25.

In a similar manner, the OTA application server 25 has access to a feature services database 29, running on the computer 25 or in a separate computer. The feature services database 29 stores the plug-in modules for all features available to the stations 5 through the carrier network 3, in versions written for each manufacture's type of wireless station 5. For the feature selection process, the carrier may also provide a web server 31 to supply web pages and receive selection inputs, to allow the users to select feature sets or ala carte feature offerings on-line.

Interworking function (IWF) equipment 33 provides a data interface similar to that provided by the equipment 19. The IWF equipment 33, however, provides an interface to a private data network operated by the carrier, shown as an IP network 35. The IWF 33 and the IP network 35 provide data communications to the OTA application server 25 and the web page server 31.

The hardware of a server, such as the server 25 or the server 31 system corresponds to that of a typical general-purpose computer, comprising a central processing unit (CPU) formed of one or more microprocessors, a number of memory devices and an interface to the data communication network, in this case to the IP network 35. Such a computer may also provide a graphical user interface (GUI) for local operation and control, for example comprising a common type of display, a keyboard and one or more of the common types of cursor controls. Various media, readable by such a system, may store or carry the executable code and any associated data, for the web pages provided by the server 31 or for the provisioning and feature module downloading performed by the OTA application server 25. Examples of such media

include semiconductor and disk type memories, digital tapes, and the like. Computer readable media used by such systems also include various types of signals sent and received by computer systems for loading software code and associated data into the memory and/or the CPU of the system hardware and sending and receiving web pages and/or plug-in modules via the IP network 35, the MSC 11, the base station 13 and the air-link.

When the user first obtains a new station 5, the user operates the cellular telephone to call the customer service center 17 to initiate provisioning. The MTAS provides provisioning data to the network elements. The customer service systems 17 also set-up an entry for the station 5 in the database 27. Once the account is set up, the user initiates a data communication with the OTA application server 25, and the server downloads data such as the mobile identification number to provision service in the handset 5, itself. A more detailed description of the over-the-air provisioning operations appears in commonly assigned U.S. Patent Application Serial No. 09/123,454, filed on July 28, 1998, by Hsu et al., entitled DIGITAL WIRELESS TELEPHONE SYSTEM FOR DOWNLOADING SOFTWARE TO A DIGITAL TELEPHONE USING WIRELESS DATA LINK PROTOCOL.

As part of the data communication session with the OTA application server 25, the station 5 may also communicate with the web page feature selection server 31. Alternatively, the user may initiate a later session with the servers 25 and 31. In any of these sessions, the user reviews lists and/or descriptions of features available via the network 3. Preferably, the user activates the web browser software of the station 5 to review feature pages from the server 31 and input selections via the station 5. Through this procedure the user selects the set of features that the user desires for the new station 5.

The carrier will typically offer packages of features, often corresponding to packages of services offered to subscribers using the cellular network 3. The packages may correspond to different levels or grades of cellular telephones, as commonly sold today. A high-end package may include virtually every feature available for the particular manufacturer's handset 5. A mid-range package of features would include the most desirable features and would support the most common services on the network. A low-end package would provide only minimal features. The carrier also may offer any or all of the features on an ala-carte basis.

When the subscriber has selected a desired feature or package of features, the selection information is forwarded to the OTA application server 25. The server updates the customer's

record in the feature database 29 to show the selection and notifies the customer service systems 17 of the purchase of the selected feature(s). The OTA application server 25 obtains one or more plug-in program modules from the feature program database 29. These modules contain the executable software code needed to enable the particular brand of digital station 5 to provide the selected feature or features. The OTA application server 25 then transmits the plug-in modules through the IP network 35 to the IWF equipment 33. The IWF equipment converts the packets containing the program code from the form used on the IP network 35 to a format compatible with transmission through the MSC 11 and the base station 131 and over the air-link to the wireless terminal device 5.

The station 5 receives the packets containing the executable software for the feature plug-in modules over the air-link. The station extracts the software from the packets and compiles the complete set of transmitted code. The station 5 verifies that each received plug-in module was correctly and completely received, and if so, the station 5 loads the module into an appropriate location in its memory. Since the carrier has provisioned the station 5 to operate on the network 3, the subscriber can now utilize the station 5 in the normal manner and to take advantage of the selected one or more handset features.

At a later time, the user may initiate a similar procedure to obtain plug-in feature modules to upgrade or replace earlier selections or to add new features to the handset 5. For this purpose, the user may contact the carrier's systems 25 and 31, as discussed above. Alternatively, the user may initiate a data session through the IWF equipment 19 and the Internet 21. In such a session, the user can select features and obtain feature modules from any appropriate source or server available on the Internet. These sources may include data systems of the manufacturer (not separately shown) or independent third party program sources, such as the server 37.

It may also be helpful to consider the structure and functionality of a wireless terminal station 5, constructed for operation in accord with the present invention.

Fig. 3 is a functional block diagram, and Fig. 4 is in a plan view, illustrating a digital telephone station 5, which may be used in an implementation of one or more embodiments of the present invention. Although the station may be incorporated into a vehicle mounted mobile unit or into another device, such as a portable personal computer, for discussion purposes the illustrations show the station in the form of a handset.

The handset 5 functions as a normal digital wireless telephone station. For that function, the station 5 includes a microphone 41 for audio signal input and a speaker 43 for audio signal output. The microphone 41 and speaker 43 connect to voice coding and decoding circuitry (vocoder) 45. For a voice telephone call, for example, the vocoder 45 provides two-way conversion between analog audio signals representing speech or other audio and digital samples at a compressed bit rate compatible with the digital protocol of the wireless telephone network communications.

For digital wireless communications, the handset 5 also includes a digital transceiver (XCVR) 57. The invention encompasses embodiments utilizing any digital transceivers that conform to current or future developed digital wireless communication standards. For example, the transceiver 57 could be a TDMA or GSM unit, designed for cellular or PCS operation. In the preferred embodiments, the digital transceiver 57 is a CDMA transceiver. The transceiver 57 provides two-way wireless communication of information, such as vocoded speech samples and digital message information. The transceiver 57 connects through RF send and receive amplifiers (not separately shown) to an antenna 59.

The mobile telephone 5, upon initializing for operation in a CDMA system, acquires the pilot channel of the base station 13, obtains system configuration and timing information for the CDMA system, and begins monitoring the CDMA paging channels. In particular, the mobile station 5 may perform paging channel monitoring procedures while in an idle state. The mobile station 5 may operate in a slotted mode, where only selected slots (e.g., one or two slots per slot cycle) are monitored on the paging channel. Alternatively, the mobile station 5 may monitor all paging and control channels if operating in a non-slotted mode. In either case, the mobile station 5 monitors the paging and control channels for a command, and transmits an acknowledgement upon receiving any message that is addressed to the mobile station 5.

The digital wireless telephone network 3 may also be implemented as a TDMA (time-division multiple access) system. TDMA systems may be implemented using either the Pan-European digital mobile radio system GSM, DSC1800, PCN (personal communication network), or the North American TDMA (NA-TDMA) digital cellular system known as IS-54. In the case of NA-TDMA, commands can be transmitted on a slot associated control channel (SACCH), which includes twelve code bits present in every time slot transmitted over the

traffic channel whether these contain voice or the 260-bit fast associated control channel (FACCH) information.

The station 5 may be a dual or tri-mode telephone, in which case the station 5 would include one or more additional transceivers (dotted line associated with the transceiver 57) conforming to an alternate standard. Initially, the additional transceiver would likely consist of an analog transceiver conforming to the AMPS standard. However, it is within the scope of the invention to include an additional digital transceiver, as well. For purposes of further discussion, however, we will assume presence of a single digital transceiver 57, preferably in the form of a CDMA transceiver.

As shown, the digital telephone handset 5 also includes a display 49 for displaying messages, pages generated by a client browser program, call related information, dialed and calling party numbers, etc. A keypad 47 enables dialing digits for voice and/or data calls and generating selection inputs keyed by the user based on displayed information.

A microprocessor 51 controls all operations of the handset 5. The microprocessor 51 is a programmable device. The mobile unit 5 also includes a flash memory 53 for storing various software routines and mobile configuration settings, such as mobile identification number (MIN), etc. The flash memory 53 has sufficient space to store the core programming of the handset 5 as well as a number of the plug-in feature modules. An example of the logical software contents of the flash memory is discussed later with regard to Fig. 5.

Flash memory is a form of non-volatile memory that stores data or executable code, which can be written over in a random access fashion but only under certain controlled circumstances. Typically, a special bit-pattern or code is required to write bits to specific locations in the flash memory. Different areas or sectors of the flash memory are accessible with different codes to provide different levels of write protection. The use of these different bit patterns to control the write operation to the sectors of the flash memory effectively limits who may access the various sectors.

For example, one area of the flash memory 53 stores the core programming of the handset 5, that is to say the operating system, the browser, etc, that provides the minimum functionality of the terminal. This area may be write-protected with a code known only to the manufacturer. The microprocessor 51 stores downloaded plug-in modules for the selected features in an area of the memory 53 that has one or more lower levels of protection. For

example, the carrier may have the code to allow access to certain areas designated for storage of feature programming required by that carrier's network, whereas the microprocessor 51 may have the code to allow all other parties to write modules for less critical features into the remaining space in the memory 53.

The handset 5 further includes a non-volatile random access memory (RAM) 55. The RAM 55 stores operating data, such as telephone numbers and other data input by the user via the keypad 37.

The handset 5 may include an expansion slot 62, to allow the user to purchase and install additional memory to allow installation of an even larger number of feature modules. The handset 5 also includes one or more I/O ports 61 coupled to the microprocessor 51. The port 61 may enable a user to connect a laptop computer or other data device to the terminal 5, for example to enable wireless data communication using the handset 5 over the network 3. For purposes of feature programming, this port 61 also allows input of modules of executable code for selected features. For example, the user may receive a floppy disk or CD with selected modules and load the modules from a computer through the port 61. As discussed more later, however, the preferred embodiment utilizes over-the-air programming to download the plug-in feature modules.

Fig. 4 shows the front of the cellular mobile station 5, in the form of a portable handset. As shown, the handset housing includes openings 63 enabling sound to emerge from the speaker 43, as well as openings 65 to allow input of sound to the microphone 41.

The handset 5 includes the visible display screen 49. The handset 5 also includes various keys making up the keypad 47. The keypad 47 typically includes at least two sets of keys 67, 69. The keys 67 represent dialing-input keys. Typically, each of the twelve keys is imprinted with a number from 1 to 0, an asterisk or star (*), and a number sign (#). Each of the keys 2 through 9 is imprinted with three or four letters, to enable input of alphabetical information.

The keys 69 are function keys. Exemplary function keys include a cursor control or scrolling key 73, a selection (SEL) key 71, a clear (CLR) entry key 75, a send (SND) key 77 and an END key 79. The send (SND) key 77 is used to initiate or answer a wireless call, and the "END" key 79 is used to terminate a wireless call.

Although other keys with other functions and/or labels may be used in place of or in addition to those shown, Fig. 3 shows three of the function keys for input of information to and retrieval of information from the processor and memory of the handset purposes of the discussion here and/or selection of features from a displayed menu or web page. One of these keys is the cursor key 73. This key at least controls up and down movement of a displayed cursor or highlight function and attendant scrolling of menus or pages shown on the display 49. In the illustrated embodiment, the key 73 also provides a left or right input for side-to-side cursor control. The exemplary keys also include the selection (SEL) key 67, which enables a user to select an option indicated by the cursor or highlighting. The clear (CLR) key 69 enables the user to erase a selection. A wide variety of other cursor controls and selection inputs could be used.

The keypad 47 supplies user input information to the microprocessor 51, and the microprocessor provides digital data signals to cause the display 49 to show appropriate information to the user. Under control of the microprocessor 51, the display 49 shows textual information, such as dialed numbers and name and number information regarding stored speed dialing lists. The display 49 also may have certain specialized indicators, such as a message-waiting indicator and various roaming or home service indicators.

Hence, under control of the microprocessor 51 and its programming, the keypad 47 and the display 49 provide a graphical user interface allowing the customer to input information and receive information. In accord with the invention, part of this user interface relates to the feature selection and programming service.

To make a routine telephone call, a user dials in the destination number by actuating the appropriate ones of the number keys 67 and then pushes the send (SND) key 77. The microprocessor 51 generates a call request message in the appropriate protocol. This message includes the dialed destination number. The microprocessor causes the digital transceiver 57 to send the message, as a signaling message, for example over the signaling channel of the particular wireless air-interface to a base station, for call set-up processing by the network 3.

In a feature selection operation, the microprocessor 51 will cause the screen 49 to display a page of information about one or more available features. The user would actuate the key 73 to move the cursor to a link to another page or to select a feature listed on the displayed page. When indicated by the cursor, the user would actuate the select (SEL) button to

effectively 'click-on' the item followed by the SND key 77 to initiate transmission. In response, the wireless terminal 5 would transmit a URL or other data corresponding to the selected item over the air-link and through the network 3, for example to the server 31.

Fig. 5 is a logical block diagram helpful in explaining the architecture of the software system 100 used in the wireless terminal device 5, in accord with the invention. In a typical implementation, the random access type flash memory 53 initially stores core programming and receives and stores one or more downloaded feature modules for implementing selected handset features.

The core programming includes an operating system 101 along with various drivers and application programs. On top of the operating system, the microprocessor 51 runs a number of software routines or applications from the memory 53. The first of these applications is a web browser program 103 designed for wireless terminals, sometimes called a thin client browser. The browser enables data communications over the network 3 and an IP network such as the network 35 or the Internet 21. The software implements a graphical user interface (GUI) 105, including a user interface for communications through the wireless network 3 and the packet data networks 21 and 35. For many services, this enables display of received pages and selection of links from the pages, for example to review available features and select desired features.

The stored programming in memory 53 also includes I/O device driver software 111 for the physical elements of the terminal 5 that provide the user interface, such as the display 49 and the keypad 47. The driver programming also includes a device driver for the I/O port 61. The stored programming also includes vocoder software 103 and call processing software conforming to the particular air-link protocol 109 of the network 3, for example conforming to the current CDMA standard.

For purposes of the feature programming, the core software may implement one or more application programming interfaces (APIs) 113, which provide a logical interface between the plug-in feature modules and the core programming. The core software stored in the flash memory 53 also includes an application 115 for implementing the download of the plug-in modules, error correction, checking for completion and loading thereof into the flash memory 53 for subsequent execution.

The software system 100 also includes a variety of the feature modules, several of which are shown as examples in Fig. 5. Feature modules typically are written to the specifications of the hardware and the API of the particular type of handset 5. The station 5 may receive, store and execute modules 121 or 123, that correspond to different sets or packages of features. Alternatively, the station 5 may receive, store and execute modules 125 for individual features. In many cases, the memory 53 of the station 5 will contain a plug-in module 121 or 123 for one package of features provided by the carrier, plus one or more individual feature modules 125 obtained from any of the available sources. The microprocessor 51 executes the feature module programming through the operating system 101 and the API 113.

Aspects of the invention relate to the software elements, such as those shown in Fig. 5. At different times all or portions of the executable code for any or all of these elements may reside in physical media or be carried by electromagnetic media. Physical media include the memory 53 of the stations 5, various semiconductor memories, tape drives, disc drives and the like of personal computers, workstations, host computers or network servers. All or portions of the software, particularly the plug-in modules may at times be communicated through various networks. Thus, another type of media that may bear the software includes, optical electrical and electromagnetic waves, such as used across physical interfaces between local devices, through landline networks and over various air-links.

While the foregoing has described what are considered to be preferred embodiments of the invention it is understood that various modifications may be made therein and that the invention may be implemented in various forms and embodiments, and that it may be applied in numerous applications, only some of which have been described herein.

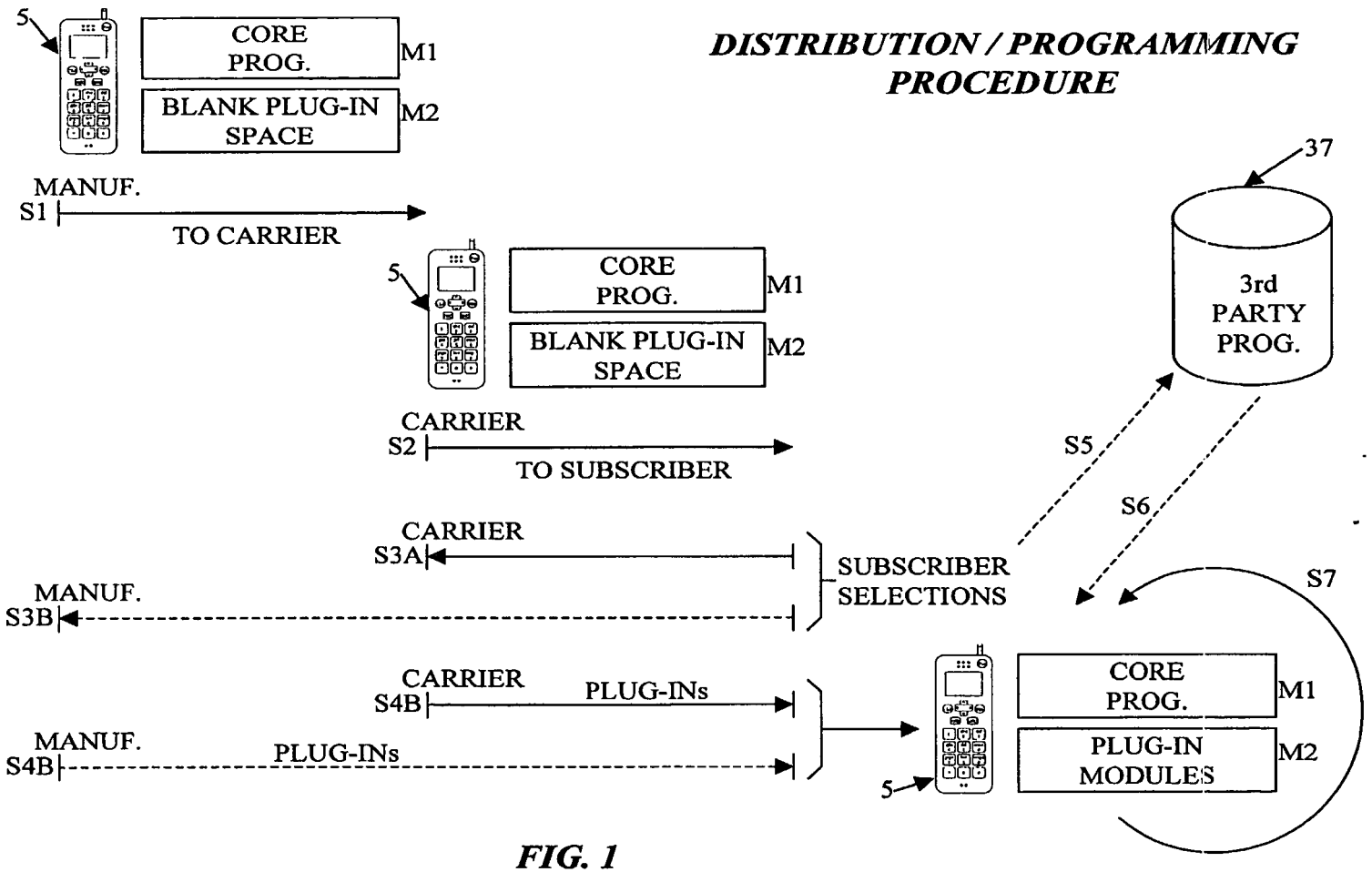

DISTRIBUTION / PROGRAMMING PROCEDURE
5
CORE PROG.
M1
BLANK PLUG-IN SPACE
M2
MANUF.
S1
TO CARRIER
5
CORE PROG.
M1
BLANK PLUG-IN SPACE
M2
CARRIER
S2
TO SUBSCRIBER
37
3rd PARTY PROG.
S5
S6
CARRIER
S3A
MANUF.
S3B
SUBSCRIBER SELECTIONS
S7
CARRIER
S4B
PLUG-INs
MANUF.
S4B
PLUG-INs
5
CORE PROG.
M1
PLUG-IN MODULES
M2

FIG. 1

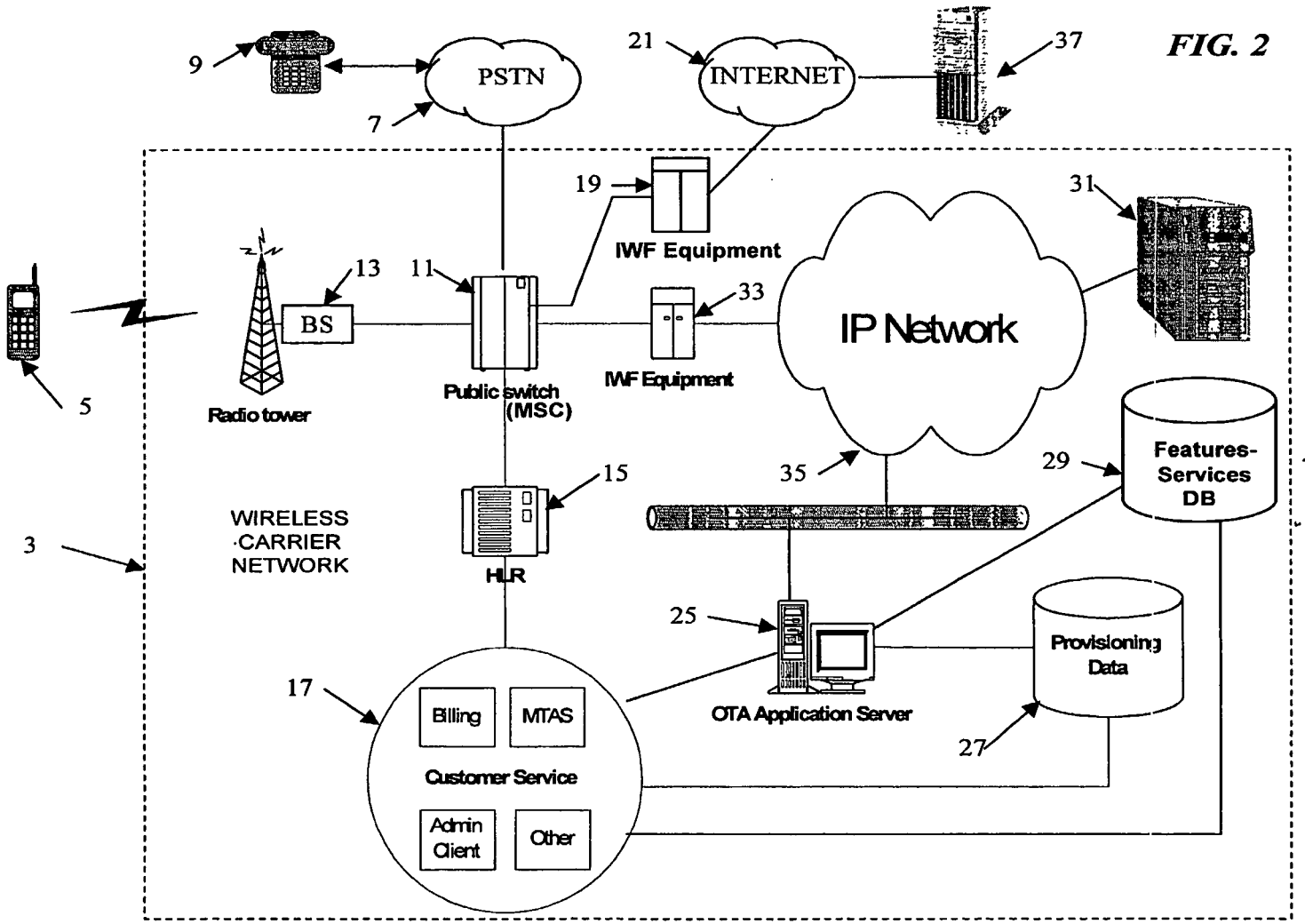
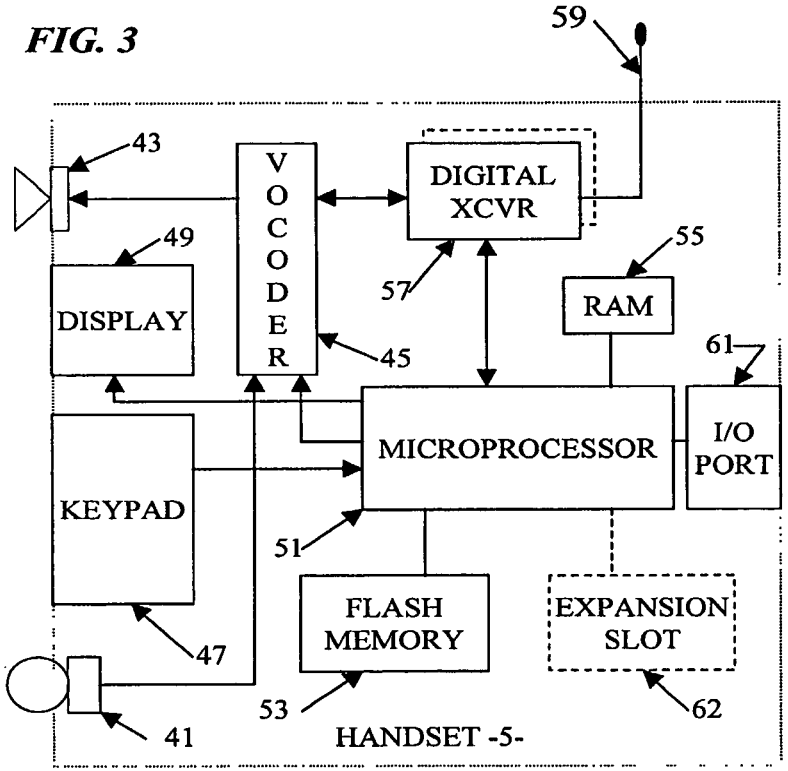

9
PSTN
7
21
INTERNET
37
19
IWF Equipment
31
13
11
BS
33
IP Network
5
Radio tower
Public switch
(MSC)
IWF Equipment
35
29
Features-
Services
DB
15
WIRELESS
CARRIER
NETWORK
3
HLR
25
Provisioning
Data
17
Billing
MTAS
OTA Application Server
Customer Service
Admin
Client
Other
27

FIG. 2

FIG. 3



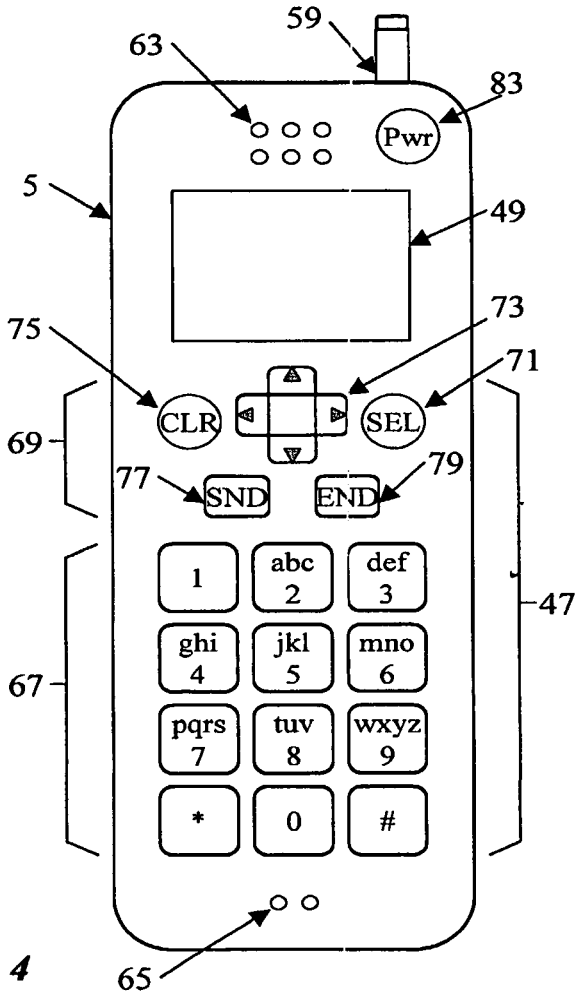


FIG. 4

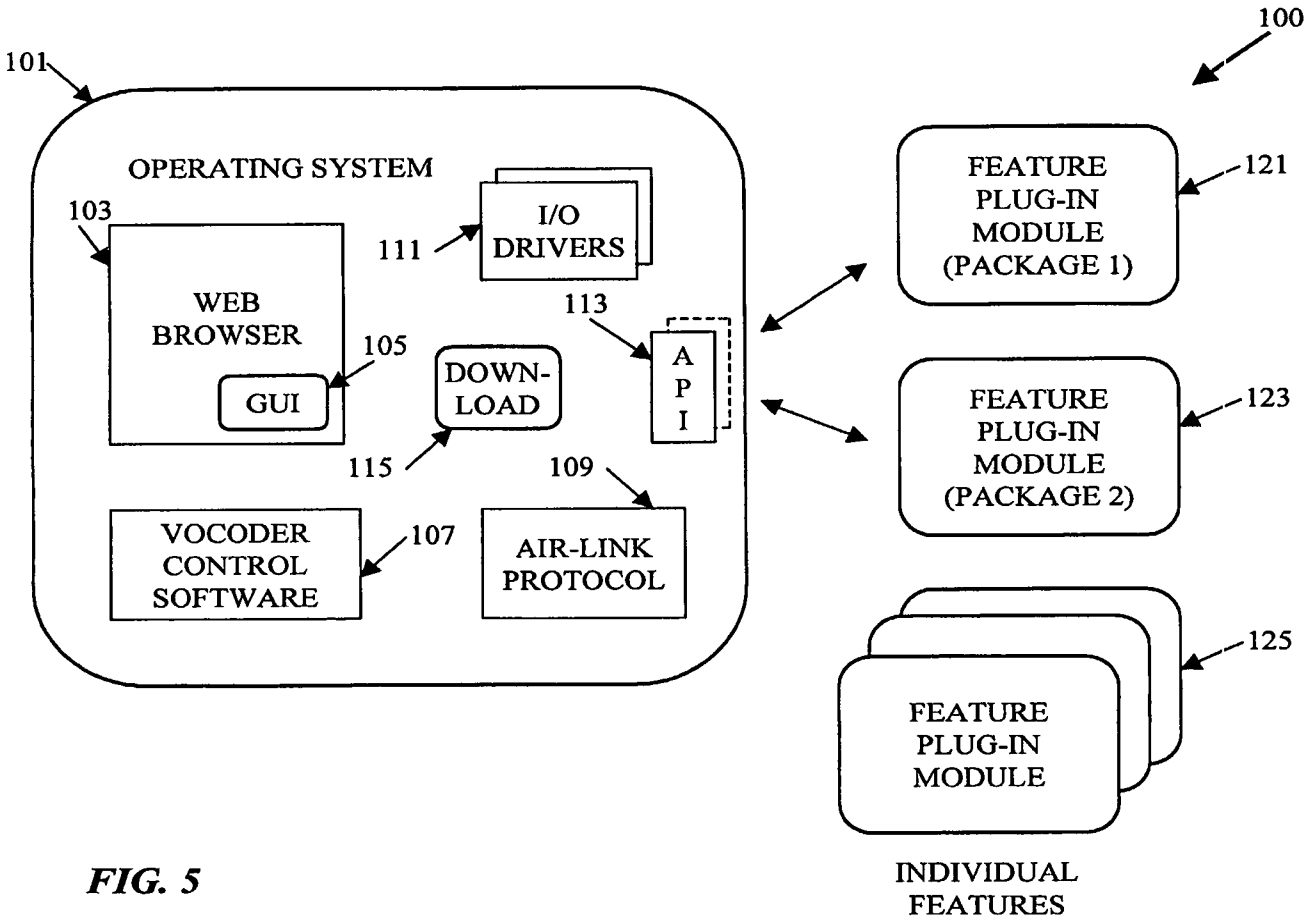

100
101
OPERATING SYSTEM
103
WEB BROWSER
GUI
105
111
I/O DRIVERS
113
A P I
DOWN-LOAD
115
109
VOCODER CONTROL SOFTWARE
107
AIR-LINK PROTOCOL
FEATURE PLUG-IN MODULE (PACKAGE 1)
121
FEATURE PLUG-IN MODULE (PACKAGE 2)
123
FEATURE PLUG-IN MODULE
125
INDIVIDUAL FEATURES

FIG. 5

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Bryan J. Moles, et al.
Serial No.:	09/542,632
Filed:	April 4, 2000
For:	SYSTEM AND METHOD FOR PROVISIONING OR UPDATING A MOBILE STATION USING OVER-THE-AIR TRANSFER OF INTERPRETED BYTE-CODE PROGRAM
Group No.:	2682
Examiner:	Eugene Yun

APPENDIX D -
Evidence Appendix

Not Applicable – No other evidence was entered.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Bryan J. Moles, et al.
Serial No.:	09/542,632
Filed:	April 4, 2000
For:	SYSTEM AND METHOD FOR PROVISIONING OR UPDATING A MOBILE STATION USING OVER-THE-AIR TRANSFER OF INTERPRETED BYTE-CODE PROGRAM
Group No.:	2682
Examiner:	Eugene Yun

APPENDIX E -
Related Proceedings Appendix

Not Applicable – To the best knowledge and belief of the undersigned attorney, there are none.

DOCKET NO. 2000.08.003.WT0 **PATENT**
Client No. SAMS01-00102
Customer No. 23990

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of	:	Bryan J. Moles, et al.
U.S. Serial No.	:	09/542,632
Filed	:	April 4, 2000
Title	:	SYSTEM AND METHOD FOR PROVISIONING OR UPDATING A MOBILE STATION USING OVER-THE-AIR TRANSFER OF INTERPRETED BYTE-CODE PROGRAM
Art Unit	:	2682
Examiner	:	Eugene Yun

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Commissioner for Patents
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The undersigned hereby certifies that the following documents:

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relating to the above application, were deposited as "First Class Mail" with the United States Postal Service, addressed to: MAIL STOP APPEAL BRIEF - PATENTS, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on August 22, 2005.

Date: Aug 22, 2005 Kathy Hamilton
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Date: 22 August 2005 John T. Mockler
John T. Mockler
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$AF
$2682

PTO/SB/17 (10-04v2)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

FEE TRANSMITTAL for FY 2005

Effective 10/01/2004. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 500.00

Complete if Known	
Application Number	09/542,632
Filing Date	April 4, 2000
First Named Inventor	Bryan J. Moles
Examiner Name	Eugene Yun
Art Unit	2682
Attorney Docket No.	2000.08.003.WT0

METHOD OF PAYMENT *(check all that apply)*

☑ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☑ Deposit Account:

Deposit Account Number: 50-0208

Deposit Account Name: Davis Munck, P.C.

The Director is authorized to: *(check all that apply)*

☐ Charge fee(s) indicated below ☑ Credit any overpayments

☑ Charge any additional fee(s) or any underpayment of fee(s)

☐ Charge fee(s) indicated below, **except for the filing fee** to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	790	2001	395	Utility filing fee	
1002	350	2002	175	Design filing fee	
1003	550	2003	275	Plant filing fee	
1004	790	2004	395	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($) 0

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

	Extra Claims		Fee from below	Fee Paid
Total Claims		-20** =		X =
Independent Claims		- 3** =		X =
Multiple Dependent				=

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	88	2201	44	Independent claims in excess of 3
1203	300	2203	150	Multiple dependent claim, if not paid
1204	88	2204	44	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 0

***or number previously paid, if greater; For Reissues, see above*

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	430	2252	215	Extension for reply within second month	
1253	980	2253	490	Extension for reply within third month	
1254	1,530	2254	765	Extension for reply within fourth month	
1255	2,080	2255	1,040	Extension for reply within fifth month	
1401	340	2401	170	Notice of Appeal	
1402	340	2402	170	Filing a brief in support of an appeal	500.00
1403	300	2403	150	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,370	2453	685	Petition to revive - unintentional	
1501	1,370	2501	685	Utility issue fee (or reissue)	
1502	490	2502	245	Design issue fee	
1503	660	2503	330	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	790	2809	395	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	790	2810	395	For each additional invention to be examined (37 CFR 1.129(b))	
1801	790	2801	395	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 500.00

SUBMITTED BY

(Complete *(if applicable)*)

Name (Print/Type)	John T. Mockler	*Registration No. (Attorney/Agent)*	39,775	*Telephone*	972-628-3600
Signature	John T. Mockler			*Date*	August 22, 2005

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